**Introduction**

**Research Background**

Effective medication adherence is key for successful management and treatment of different health problems. Medication non-adherence is a significant public health issue, especially among hypertensive patients, since it can be difficult to persuade them to take medication without the manifestation of the symptoms. For instance, when the patient is prescribed with antihypertensive medication, they take it for some time and stop once they feel and report no more symptoms and their blood pressure has been normalised. Cardiovascular diseases accounted for 5,278.4 per 100,000 age-standardised disability-adjusted life years in 2016 in Nigeria, according to the [Global Burden of Disease](https://www.healthdata.org/research-analysis/gbd) (GBD) (Gakidou et al. 2017). The top two major causes of disability adjusted life years and years of life lost (YLLs) worldwide are hypertension-related disorders (particularly, ischaemic heart disease and cerebrovascular illness) (Okubadejo et al., 2019). According to World Health Organisation (2002), hypertension is majorly asymptomatic and only diagnosed after a major organ failure or incidentally. Thus, it poses a risk to patients who are not aware of their condition.

Hypertension is characterised by a persistently elevated blood pressure in the systemic vasculature. Hypertension is the most prevalent preventable risk factor for cardiovascular disease, including ischaemic heart disease, congestive cardiac failure, cerebrovascular disease (stroke), atrial fibrillation, myocardial infarction, chronic renal disease, and peripheral vascular disease (Oparil et al., 2018). Worldwide, there are 3.5 billion adults with sub-optimal blood pressure values with estimates suggesting that 1 in 4 adults are reported to be diagnosed with hypertension (Forouzanfar et al., 2017). The Global Burden of Disease project revealed that poorly controlled blood pressure is the most significant risk factor that contributes to the global burden of disease and the evidence also suggests that hypertension increases the risk of all-cause mortality (Benziger et al., 2016, Zhou et al., 2018).

According to the National Institute for Health and Care Excellence (NICE) guidelines in the United Kingdom for the management of hypertension, two consecutive blood pressure readings of 140/90 mmHg or higher fulfils the diagnosis of hypertension (NICE, 2019). The NICE guidelines indicate that lifestyle interventions, anti-hypertensive therapy, and close monitoring of blood pressure and end-organ damage are the cornerstones of management of hypertension (NICE, 2019). Lifestyle modifications such as adopting a high-fibre, low-fat, and whole foods rich diet, undertaking moderate-to-high intensity exercise for at least 30 minutes thrice-weekly, and undertaking smoking cessation have been shown to be effective in optimising blood pressure in patients with hypertension (Aronow, 2017). The NICE guidelines indicate that antihypertensive therapy should be offered to patients who have persistent hypertension above 140/90 mmHg despite undertaking the aforementioned lifestyle interventions (NICE, 2019). Examples of antihypertensive drugs include beta-blockers (e.g., atenolol and bisoprolol), angiotensin-converting enzyme (ACE) inhibitors (e.g., enalapril and lisinopril), angiotensin-receptor blockers (e.g., losartan and valsartan), calcium channel blockers (e.g., amlodipine and nifedipine) and diuretics (e.g., frusemide and hydrochlorothiazide) amongst others (Musini et al., 2017).

Non-adherence is a common problem in patients with chronic diseases such as hypertension (Abegaz et al., 2017). Non-adherence is associated with increased healthcare costs, an increased rate of hospitalisations, and an over-utilisation of healthcare services (Straka et al., 2018). The World Health Organisation (WHO) defines adherence as *“*the degree to which [a] person’s behaviour corresponds with the agreed recommendations from a health care provider” (cited by Jimmy and Jose, 2011, p.155). The NICE guidelines defined adherence as the degree to which an individual’s actions correspond with the agreed recommendations by a healthcare provider (NICE, 2009). A review of the literature reveals that there are three main types of non-adherence to pharmacotherapy. These are primary non-adherence, non-persistence, and non-conforming behaviours (Jimmy and Jose, 2011).  Primary non-adherence is defined as prescriptions which are written by healthcare providers, but not initiated. Non-persistence occurs when patients decide to stop taking medications after starting them without the advice of a healthcare provider (Jimmy and Jose, 2011). Finally, non-conforming behaviour involves skipping doses, consuming medications at inappropriate times, or even consuming medications at the wrong dosage.

The evidence suggests that blood pressure control amongst hypertensive patients is poor – only 60% of hypertensive patients achieve the therapeutic goals set out by their healthcare providers (Burnier, 2017). There are several reasons for non-adherence. One systematic review sought to explore these reasons and categorised them as follows – patient-related, medication-related, healthcare provider related, health care system related, and socioeconomic factors (Lee et al., 2018). According to DiMatteo et al. (2021), a number of factors may contribute to non-adherence to prescribed pharmacotherapy. They proposed that these factors could be: - the person may not understand what they have to do, lack the motivation to resolve their underlying diseases, lack a strategy for abiding by the prescribed pharmacotherapeutic regimen, or fail to recall information (DiMatteo et al., 2021). Specific reasons for non-adherence to prescribed pharmacotherapy include poor communication between healthcare providers and patients, poor knowledge regarding the prescribed drugs, poor understanding regarding the indications and adverse effect profiles associated with specific drugs.

Hypertension is the leading cause of morbidity and mortality in Africa and Nigeria (setting for this current study), which is the most populous country in Africa contributes to this disease burden. The global prevalence of hypertension is increasing, and the African continent appears to be the most affected region worldwide (Akinlua et al., 2015). One 2015 study found that the overall prevalence of hypertension in Nigeria was 29% (Adeyole et al., 2015). In contrast to this figure, the pooled awareness rate of this disease was only 17.4%. Researchers estimated that the number of hypertensive patients in Nigeria would increase to 39 million by the year 2030, with a prevalence of 30% (Adeloye et al., 2015). Akintunde and Akintunde (2015) further noted that social determinants of health may also contribute to non-adherence to anti-hypertensive pharmacotherapy amongst Nigerian hypertensive patients. One study found that patients with good medication adherence were more likely to be better educated and are from higher socio-economic classes compared to those with poor medication adherence.

This systematic review seeks to analyse the issue of medication adherence in Nigerian hypertensives. The systematic review has been chosen as the approach for this topic as it ranks highly in the hierarchy of evidence (Burns et al., 2011). In this regard, the Preferred Reporting Items for Meta-Analyses and Systematic Reviews (PRISMA) guidelines shall be used to guide the conduct of this systematic review (Selçuk, 2019). There is a need to address this research question for the following reasons. First, the level of non-adherence to anti-hypertensive pharmacotherapy in the Nigerian patient population is not well defined. Indeed, a review of the literature reveals a paucity of studies which elucidates the prevalence of non-adherence to hypertensive therapy in Nigeria as well as the reasons for this issue. Second, there has never been a more important time to conduct a systematic review on this topic – the prevalence of hypertension is increasing globally, and the African continent contributes to the global burden of hypertension more than any other region worldwide (DiMatteo et al., 2021). Third, the available studies provide conflicting results, recruited patients with varying demographic factors, studied different hypertensive therapeutics, and used varying measures of adherence (Adeyole et al., 2015; Akinlua et al., 2015).

According to Gascón et al. (2004), medication adherence is among the predictors of hypertension treatment success, whereas poor medication adherence, as well as a lack of information and understanding about hypertension, have been identified as some of the primary consequences of poor hypertension control, that has a direct effect on patients’ wellbeing. When drug adherence is low, the therapeutic benefits of the medication are decreased, and the overall efficacy of prescribed treatment is reduced. The reduced quality of treatment arises from a lack of commitment to pharmacological treatment for reduced efficacy and productivity in hypertension treatment. Poor compliance with antihypertensive therapy is a significant public health problem that leads to complications, injuries and hypertension-related fatalities (Ajayi et al., 2018).

Okwuonu et al. (2015) have identified factors that contribute to poor blood pressure regulation as patient-related obstacles, such as a lack of information about hypertension, unrealistic treatment standards, weak medication adherence, incomprehension of lifestyle change and failure to apply them (Okwuonu et al. 2014). Further, in their study, Boima et al. (2015) reported a high rate of medication non-adherence of 66.7%, which is different to the findings by Ibrahim et al. (2020), who reported a drop in non-adherence to antihypertensive at 56.6%. In the study by Boima et al. (2015), 56.6% of hypertensive patients were found on follow-up at Federal Teaching Hospital, Ido-Ekiti. This level of non-adherence, on the other hand, was higher than 17.2% in Enugu, South-East Nigeria, 24.2% in Port Harcourt, South-South Nigeria, 34.5% in Kano, North-West Nigeria, 46.4% in Abeokuta, South-West Nigeria, and 53.3% in Ilorin, North Central Nigeria. The results obtained by Boima et al. (2015) were also higher than those published in other African countries, with Kenya reporting 33.4% and Ethiopia reporting 50.3% of non-adherence to hypertensive medication. Awokola et al. (2016) reported a low adherence rate of 59.8% of the participants. This indicates that more than half of the diagnosed cases are non-adherent, thus resulting in the increase in the utilisation of healthcare services.

Akitunde and Akitunde, (2015), suggested that adherence to hypertensive medication increases in line with the length of time the person has been diagnosed with the condition. This result builds upon previous studies that showed that adherence is higher in elderly patients than in younger patients. Consequently, patients who utilised clinic reported a higher adherence level irrespective of the period one has been diagnosed with hypertension, a higher number of medications administered, and a relatively young age, as indicated by other studies as a predictor of non-adherence (Adisa, Ilesanmi, and Fakeye, 2018). This may be due to the specialised treatment and available information in a specialist clinic for the management of chronic diseases.

According to the study by Adisa, Ilesanmi, and Fakeye (2018), medication adherence in hypertensive patients was dependent on the period one had been diagnosed with the condition (the more years one has had hypertension the more they are likely to adhere to the medication) presence of comorbidity, socioeconomic status (financial ability which impacts their ability to buy medication continuously or pay their health insurance and the cultural practice) as well as held beliefs on the condition and medications. Osamor and Owumi (2011), however, indicated that only 51% of hypertensive patients are compliant because they believed hypertension is curable with herbal medication and thus there is no need for medication. Similar results were reported by Akitunde and Akitunde, (2015) who illustrated that adherence improved with years of diagnosis. There was reported high adherence among those who have had the condition for more than five years and have comorbidity as compared to those with less than five years, only diagnosed with hypertension or held a traditional belief over the medication or the condition. Adisa et al.’s (2018) findings are consistent with other studies by Boima et al. (2015) and Akitunde and Akitunde (2015) that reported high adherence among older patients.

The hypertension prevalence in adults in Nigeria has been estimated to be between 2.1 and 41.72 percent (Akinlua et al., 2015). The prevalence varies depending on the setting for the study, age, and sex. According to the literature, there is a high prevalence in urban areas as compared to the rural setting (Akinlua et al., 2015). The study also claims that Nigerian men are more prone to hypertension than their female counterparts, despite the fact that women reported poorer blood pressure management than men (Akinlua et al., 2015). According to Forouzanfar et al. (2017), hypertension is a leading cause of the world’s mortality and morbidity rates and Nigeria is not an exception as hypertension is reported as a leading cause of death (Akunne and Adedapo, 2019). These deaths, according to Akunne and Adedapo (2019), are related to the hypertension complication resulting from drug non-adherence. In addition, they further argued that not all people who are hypertensive are aware of their condition.

Bakere et al. (2016) examined the prevalence of hypertension and concluded that hypertension screening should be integrated into primary care diagnosis. They also reported that hypertension is commonly associated with comorbidity, which suggested that the prevalence rates was higher than reported because some cases were not reported. According to the report by Odili et al. (2020), 38% of adult Nigerians aged 18 years and above have hypertension. They reported that 60% of the participants with high blood pressure were conscious of their condition, a third were receiving treatment and 12% had their condition under control (Odili et al., 2020). The prevalence of hypertension ranged from 20.9% in the North-Central region to 52.8% in the South-East. According to Odili et al. (2020), hypertension was present in both urban and rural settlements. This contradicts the research results obtained by Boima et al. (2015), which indicated a high prevalence of hypertension in urban areas as compared to rural areas. However, urban residents were more knowledgeable about the disorder and received care for it than their rural counterparts.

The diagnosis of hypertension can be depressive, especially with the fear of the potential prognosis. Osamor and Owumi (2011) argued that holding certain beliefs about medication was an influencing factor for medication compliance. The study illustrated that the community believed that the use of orthodox and herbal medication cures hypertension, thus explaining why they did not adhere to the prescribed medication. The study further illustrated that patients with monotherapy were more compliant than those with multiple medications. The findings by Adisa et al. (2018) were different to those of Osamor and Owumi (2011) who reported a high adherence rates in a monotherapy. Adisa et al. (2018), however, argued that patients with at least two types of medication reported a high adherence rate as compared to those prescribed with a single medication. Boima et al. (2015) argued that concerns about becoming dependent and a lack of knowledge regarding the curability of hypertension were associated with medication non-adherence. The findings by Okwuonu et al. (2014), in return, illustrated that medication adherence is attributed to patient-related challenges such as a lack of information about hypertension, unrealistic treatment standards, weak medication adherence, incomprehension of lifestyle change and failure to apply them.

Akunne and Adedapo (2019) argued that the prescribed medication impacts the patients’ adherence or non-adherence behaviour. The study highlighted that the combined prescriptions increased non-adherence as compared to a single therapy. The research further indicates that the different prescriptions have different costs and thus, costly medication are more prone to not being purchased, especially for those who have to pay for the medication themselves. In their study, Okwuonu et al. (2014) agreed with the aforementioned assertion by indicating that patients with multiple prescriptions either forget to take all their medicines or do not remember to carry them during the day when they left their homes. Awokola et al. (2016) have asserted that patient-related factors are the major contributors to non-adherence. The study reported that lack of funds to purchase medication, forgetfulness, the availability of herbal remedies, spiritual healing, which can be promoted by the spiritual leaders, and misinformation about the seriousness of the condition are the main factors contributing to the patients’ non-adherence.

Odiase and Ogbemudia (2019) observed that the development of another condition could result in the non-adherent of antihypertensive medication. They reported that more than 30% of stroke survivors became non-adherent after a few months after experiencing the stroke. Akinlua et al., (2018), reported that the beliefs held by public health careers on hypertension with regards to the management and curability of hypertension can impact on patients’ adherence to medication. They reported that these public health careers pass the information to the patients based on what they know; thus, there is a need to have a clear education concerning hypertension to enable them to correctly inform the patients.

Literacy levels have been demonstrated to impact the adherence level of the hypertension level. Osamor and Owumi (2011) indicated that the patients did not have adequate knowledge concerning the nature of hypertension and thus impacting their decision. Boima et al. (2015) agreed and stated that an increase in literacy levels among Nigerians has had a positive impact on adherence, albeit of low significance. Consequently, another study by Kazaure et al. (2017) indicated that drug adherence is associated with social factors. In the research, younger civil servants were significantly more likely than senior civil servants to be non-compliant. One potential explanation is that junior civil servants have lower salaries than senior civil servants, and possibly cannot afford to purchase these medications. In addition, as opposed to senior civil servants, junior civil servants are younger. Previous research by Adisa et al. (2018), Boima et al. (2015), and Akitunde and Akitunde, (2015) has established that older patients are more likely to adhere to their medication regimens. Patients who ran out of their medications before their next doctor visit were more likely to be non-adherent than those who did not (Kazaure et al., 2017).

Boima et al. (2015) found that patients who were not adhering to the treatment plan were younger than those who demonstrated adherence. One possible cause is that older patients are more worried about their health than younger patients and they receive enough counselling about the consequences. In comparison to Akitunde and Akitunde, (2015), non-adherence in the young patient is related to the shorter period form diagnosis of the hypertension. Contrary to this, Ibrahim et al. (2020) have indicated that the increase in the duration of the condition and age did not impact adherence of hypertensive medication.

Another study by Akintunde and Akintunde (2015) evaluated the adherence to hypertensive medication as well as the determinants concerning the place of care. The findings illustrated that the patients who attended the clinic at the specialist’s centre had a higher adherence rate as compared to those who went to the general public clinics. The study indicates that the difference in social-economic status impacts the place where individuals seek care. Akintunde and Akitunde (2015) further observe that the high adherence among the patients who attended specialist clinic resulted in receiving personalised and focused care. According to Akunne and Adedapo (2019), Nigerians’ socioeconomic status is still low compared to other Africa nations such as South Africa and the western world, with many people living below the poverty line. The study indicates that financial constraints prevent them from meeting their basic needs such as health needs and food. This prevents individuals from consistently purchasing their medication, especially when they do not have health insurance and depend on it out of pocket. The findings agree with a previous study by Adisa et al. (2018), which identified the cost of medication as an impeding factor as not all patients could afford the medication prescribed for them.

Oluwole et al. (2019), on the contrary, argued that there is no correlation between medication adherence and patient satisfaction and thus patients’ counselling and education should be enhanced to support the acquisition of positive outcomes. According to the study by Adeyemo et al. (2013), patients were involved in a 6-month randomised trial. The findings indicated a 77% adherence rate with higher non-adherent being reported among the rural dwellers than in urban areas. Odili et al. (2020) agreed by illustrating that hypertensive patients in urban areas were more knowledgeable about the condition compared to rural dwellers. The study points to access to primary care facilities as an underpinning factor as it hinders some patients from consistently attending their clinics.

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