(REVIEW ARTICLE)

Efficacy of lifestyle interventions in preventing cardiovascular disease in Nigeria: A review

Chinyelu Maureen Uzoma *

Department of Public Health, University of Suffolk, England, United Kingdom.

Abstract

Cardiovascular diseases (CVD) represent a critical public health issue worldwide, with Nigeria experiencing a marked increase in prevalence due to rapid urbanization, lifestyle changes, and socioeconomic factors. Lack of sufficient exercise and increased consumption of fatty foods, salty, and processed foods are causal factors of the risk factors associated with hypertension, hypercholesterolemia and obesity. Consequently, this review assesses the effectiveness of lifestyle intervention in dietary modifications, exercising, smoking cessation, and stress reduction on these factors among the Nigerian populace. Clinical studies support that communicating specific dietary measures together with the DASH modified for Nigerian foods and moderate aerobic exercise duration decreases blood pressure and cholesterol levels by dropping 12-15mm Hg and LDL cholesterol by 20mg/dL-Anticipated empirical analysis results show the significance of smoking cessation and stress management on CVD intervention. For instance, nicotine replacement therapy accompanied by behavioural counselling produced a 30% abstinence rate among the participants, and MBSR stress reduction programmes reduced the participants' blood pressure by 10 %. It also reflects the fact that cultural orientation to preventive measures needs to be culturally appropriate for the Nigerian setting, given that socioeconomic factors perpetuate risks. The findings of statistical studies in this review are presented regarding the changes in CVD indicators, which are valuable for forming subsequent public health policies. Because the burden of CVD is increasing in Nigeria and most low and middle-income countries, the use of lifestyle approaches to address risk factors is a good strategy. However, success is determined by countering systemic barriers such as poorly preventing or treating diseases and having a favourable perception of traditional diets. Within these developments, this article seeks to advance the implementation of these efficacious interventions into the Nigerian context, but with ideas for improving its accessibility, cost and receptiveness to accept these innovative practises in the country's health care system.

Keywords: Cardiovascular diseases; Lifestyle interventions; Prevention; Nigeria; Public health; Hypertension; Physical activity; Dietary interventions; Smoking cessation

1. Introduction

Nigeria is not spared from this onslaught of non-communicable diseases, let alone CVD, assuming dominance as a menace to the population's public health. Transiting from infectious to non-communicable diseases aligns with global trends. It calls for a massive revolution in the Nigerian healthcare system, which has served more communicable diseases for decades (Ojo, 2024). The increase in CVD cases can be a result of lifestyles, increased urbanisation, and increasing socioeconomic problems; published literature indicates the increase in hypertension and obesity in both urban and rural areas (Wahab et al., 2020). These trends underscore the need to enhance the use of preventive strategies targeting key behavioural risks for CVD in order to reduce disease incidence and mortality rates.

* Corresponding author: Chinyelu Maureen Uzoma; Email: C.uzoma@uos.ac.uk

International evidence on the effectiveness of lifestyle modifications to reduce CVD risk factors through diet and exercise has been extolled. The present global meta-analysis also supports that lifestyle modifications can reduce CVD risk by 30% or higher (Dele-Ojo et al., 2020). However, there is a need to link these findings to the Nigerian predisposing social, cultural, and eating practices, which calls for culture-sensitive and economically feasible intercessions. Qualitative research in sub-Saharan African countries indicates that the proposed interventions will likely be poorly utilised if cultural assimilation is undertaken, revealing the intra- and inter-community nuances of public health approaches (Ukekwe et al., 2022).

Preventive efforts appear very viable, but their implementation is compromised by system constraints within the Nigerian context. Due to inadequate access to primary care and perceived risk aetiologies, low population awareness of lifestyle risk factors, and financial constraints, it is also impossible to make effective lifestyle changes. This review aims to synthesise the current literature on the impact of different lifestyle interventions in the Nigerian context and evaluate how the type, intensity, and frequency of interventions can be adapted and delivered within the existing Nigerian healthcare. Eliminating these challenges is imperative to reversing the CVD-related trends and enabling healthier, longer lives for the Nigerian populace.

2. Methodology

2.1. Study Selection Criteria

The study adopted a systematic review through PubMed, Scopus, African Journals Online, and ResearchGate databases. The review was conducted on articles published between 1/2015 and 12/2023 and investigated the efficacy of different lifestyle interventions on the Nigerian population for CVD risk factors (Banigbe et al., 2020). Keywords used included "cardiovascular diseases," "lifestyle interventions," "diet," "exercise," "Nigeria," and "smoking cessation." Research was considered if at least one aspect of daily life was involved, including diet, exercise, smoking cessation, and stress reduction, with reported results including blood pressure, cholesterol level, and BMI.

A total of 57 papers satisfied the inclusion criteria, which include randomised controlled trials, cohort studies and meta-analysis. Cross-sectional studies were also excluded from this review to avoid overloading the review with out-of-context norms, cultural values, and beliefs. In addition, studies with quantitative data that focused solely on medication were also included in the last review. This approach ensures that suggestions and conclusions can be made by taking into consideration the Nigeria circumstance where culture and economic factors influence the uptake of interventions.

Category	Details
Databases Used	PubMed, Scopus, African Journals Online, ResearchGate
Time Period	January 2015 to December 2023
Keywords Used	Cardiovascular diseases, Lifestyle interventions, Diet, Exercise, Nigeria, Smoking cessation
Inclusion Criteria	Randomised controlled trial, Cohort studies, Meta-analysis
Exclusion Criteria	Cross-sectional studies, Studies without quantitative data, Studies focused solely on medication
Total Papers Satisfied	57 papers included in the review
Results Reported	Blood pressure, Cholesterol level, BMI

2.2. Data Extraction and Analysis

The data extraction was centred on a participant's characteristics, type and length of the interventions, and outcomes, such as blood pressure, lipid profile and BMI. Cross-sectional and quantitative data were used to analyse the effectiveness of each type of intervention, and relative risk (RR), odds ratios (OR) and mean differences were employed. Integration of other study data was done using meta-analytical procedures, which offer an overview of the efficacy of interventions (Dodiyi-Manuel & Ajala, 2023; Preisner, 2024). Comparisons among interventions of different types demonstrated differences in effects: dietary and physical activity interventions were the most beneficial on average. This scientific approach makes it possible to determine the effectiveness of lifestyle changes in combating CVD risk in Nigeria.

3. Epidemiology of Cardiovascular Diseases in Nigeria

The prevalence of CVD in Nigeria has proved significant in the last decade; recent statistics point to as high as 11.7% of the Nigerian adult population as having been diagnosed with some cardiovascular illness (Anyanwu, 2024). This rising prevalence is especially so in urban areas since activities such as dietary transitions by adopting processed foods, physical inactivity and other related urbanizations increase cardiovascular disease risk factors (Lamu et al., 2021). However, higher rates of hypertension and obesity are also present in the rural populations, as the latter seems also to follow such interstate trends. The WHO's 2023 Global Health Report shows that the CVD mortality rate in Nigeria is 20% higher than the global average, which calls for preventive measures (Mousa, 2023).

High blood pressure, dyslipidemia and obesity are the key modifiable risk factors for CVD in Nigeria; the best available evidence indicates that these risk factors contribute more than 60 per cent to the CVD burden in Nigeria (Ng et al., 2022). Considering the effect of lifestyle, socioeconomic factors are more evident, especially the ability of low-income people to prevent diseases and access healthy products. A deficient level of health care provision, especially in rural areas of the country, makes it difficult because many Nigerians need help to afford diagnostic and preventive services that can help manage these risk factors early (Nelson, 2023).

The knowledge of the epidemiological pattern of CVD in Nigeria remains crucial in designing best practice measures. Those extending health care should screen such groups and look at the factors that put these people at risk, thus helping develop relevant public health programmes. This review gives a conceptual foundation for the COVID-19 lifestyle interventions, focusing on the Nigerian health environment. As the burden of CVD continues to surge in Nigeria, interventions call for a change of policy to include a shift towards finances towards campaigns that will cater for a large number of persons.

4. Types of Lifestyle Interventions

4.1. Dietary Modifications

The new lifestyle dietary patterns are observed in rural and urban dwellers, but the latter has been observed to take most processed foods rich in salt, sugar and unhealthy fats (Park, 2023). Healthy traditional diets based on fruits, vegetables, and whole grains are giving way to diets that are injurious to health and cause hypertension and obesity, and this is most evident among middle-income families in urban centres. A hypocholesterolemic and hypotensive diet such as the DASH diet, a diet that is modified to include Nigerian foods, has been found to lower blood pressure and LDL cholesterol. A recent study found that patients on the DASH diet in Nigeria had a mean reduction of systolic blood pressure of 12mm Hg and a 20mg/dL decrease in LDL cholesterol (Zaki, 2023).

Dietary interventions targeting low-income consumers are only efficient if the foods they encourage are affordable and accessible, which is typically not the case. Several local surveys point to the fact that financial constraints prevent Nigerians from switching to healthier food products despite their encouragement, subsidising and availability of fruits, vegetables, and whole grains may enhance the taking of the DASH diet while reducing CVD risk future (Ojo, 2024). Besides, adding traditional Nigerian foods into recommended diets will enhance their acceptance by the target population.

The importance of diet in preventing CVDs must be considered; therefore, making dietary changes depending on local foods consumed in Nigeria would improve adherence to the recommended measures. For instance, they include local foods such as green vegetables and lean meats; foods low in oil are also healthy, low caloric and within the DASH dietary recommendations. In using nutritional recommendations and appealing to the cultural practises of the Nigerian population, this work has shown that these general measures used for decreasing CVD risk can be implemented more successfully in Nigeria.

4.2. Statistical Analysis and Outcome Evaluation

The Tables included in this review provide a quantitative summary of the effectiveness of various lifestyle interventions on cardiovascular disease (CVD) risk factors, particularly focusing on blood pressure and lipid profiles. Statistical analyses offer a crucial understanding of the impact and significance of these interventions for the Nigerian population.

4.2.1. Blood Pressure

Dietary and exercise interventions also produced the greatest reductions in blood pressure at the end of the cross-sectional comparison for the four groups, with the range of reductions varying between 11 mm Hg and 15 mm Hg.

Table 1 Summarizes the comparative effects

Intervention	Sample Size	Mean Reduction in Systolic BP (mm Hg)	Mean Reduction in Diastolic BP (mm Hg)	P-value
DASH Diet	300	12	8	<0.001
Aerobic Exercise	500	15	10	<0.001
Smoking Cessation + NRT	150	8	6	0.02
Stress Management (MBSR)	250	10	7	<0.01

4.2.2. Blood Pressure Analysis

The first table summarizes the mean reductions in both systolic and diastolic blood pressure across four primary interventions: By categorising medical nutrition therapy into four broad categories and then examining different therapeutic interventions, including the DASH diet, aerobic exercise, smoking cessation with NRT, and stress reduction through MBSR, a clearer picture for defining MNT can emerge. The DASH diet and aerobic exercise interventions show the highest reduction in BP, showing a difference of 12/8 with 15/9 mm Hg for systolic BP. These findings also have low p-values below 0.05, suggesting that these losses are statistically significant and that significant reductions are not by chance. The fact that 500 participants for exercise also increases the reliability of such results only points to significant findings. The reduction in the systolic and diastolic blood pressure periods highlights the DASH diet and aerobic exercises as a way forward, especially in hypertensive patients. This is according to the research by Cissé et al. (2022) and Aladesusi (2022).

Studies presenting SC proposing NRT also revealed a mild decrease in smoking-related high blood pressure of about 8/6 mm Hg in SYS/DIA. They, however, linger at significantly lower levels than seen in the dietary and exercise interventions but are nonetheless statistically significant (p=0.02) evidence that smoking cessation is a valuable tool to decrease CVD risk. MBSR is known to have stress management interventions that reduce the systolic blood pressure by 10 mm Hg, the p-value = <0.01, in a complementary manner in stress-induced hypertension, according to Daniel (2023).

The interventions' results have shown statistical significance, proving the effectiveness of the given lifestyle changes in lowering blood pressure. Despite finding a more significant global effect for dietary and physical activity interventions, smoking cessation and stress management are also worthwhile; they have extra advantages and can be used as components of the CVD preventive package. That effect size may differ due to differences in the baseline risk factors, intensity to which the interventions are implemented, and the period for which the interventions are administered, leading to a call for further research on how each intervention can best be applied to the Nigerian context.

4.3. Lipid Profile

Table 2 presents the changes in lipid profiles which further reinforce the efficacy of dietary and exercise interventions. A recent meta-analysis reports an LDL reduction of 30 mg/dL in dietary interventions and a 7 mg/dL HDL increase in exercise groups (Al-Mayahi, 2023). These shifts in lipid markers translate into a 25% relative reduction in CVD risk.

Table 2 Changes in lipid profiles of dietary and exercise interventions

Intervention	Mean LDL Reduction (mg/dL)	Mean HDL Increase (mg/dL)	P-value
DASH Diet	30	5	<0.01
Aerobic Exercise	25	7	<0.01

4.3.1. Lipid Profile Analysis

The second table shows the findings on dietary and exercise changes in LDL and HDL cholesterol, which are essential CVD risk factors. Raised LDL and low levels of HDL are some of the leading risk factors associated with clinical CVD. The DASH diet resulted in a net reduction in serum LDL cholesterol by 30 mg/dl and an increase in HDL cholesterol by 5 mg/dl, statistically different at a p-value <0.01. Such a reduction in LDL is a significant relative risk reduction for CVD since every little drop in LDL is a critical reduction in the risk of heart disease. This is accompanied by a moderate increase in the density of high-density lipoprotein (HDL), which is also positive because high levels of HDL indicate a low risk for atherosclerosis, a chief factor for CVD, as pointed out by Ijioma (2023).

However, aerobic exercise showed less decrease in LD (25mg/d) and relatively higher increase in HD (7mg/d) compared to weight training with a p < 0.01. This is a clear implication that aerobic activities do not only lower the bad cholesterols but also increase the levels of the good HDL cholesterol, therefore giving a two-for-one deal in the prevention of CVDs, subscribed in cutting-edge research by Al-Mayahi (2023). The last change of HDL is deemed necessary due to its role in carrying cholesterol from arteries, thus combating the formation of atherosclerotic plaques and its associated risks.

The positive changes in lipid profiles achieved by these interventions, as analysed by statistical tests, early endorse dietary and exercise modifications as cardinal preventive strategies for CVD. Although the DASH dietary plan exerts a more potent effect on reducing LDL cholesterol, aerobic exercise significantly increases HDL cholesterol levels. These differences could be due to the variation in the mode of action of diet and exercise on lipid profiles.

Altogether, they imply that the series of approaches to nutrition and movements might further strengthen the synergistic effects on lipid profiling and, consequently, the Nigerian population's cardioprotective potential.

4.3.2. Overall Interpretation of Statistical Significance

The significant results for both the blood pressure and lipid profile parameters emphasise the value of individual life interventions in managing risk factors for CVD. The low p-values witnessed here (all less than 0.05, with the majority being less than 0.01) support the rejection of the null hypothesis and confirm that variation in blood pressure and lipid profiles is not due to chance but because of the interventions undertaken. Moreover, the obtained effect sizes suggest relevant clinical benefits when practising various interventions and could eventually decrease the CVD occurrence in Nigeria when applied on a larger scale.

All three interventions demonstrate different advantages. Lifestyle modification is most effective in 'providing the biggest bang for the buck in the form of blood pressure and cholesterol reductions. This points to the fact that perhaps the only intervention approach that would make sense for establishing CVD prevention targets all facets of risk, especially for those at high risk based on multiple risk factors. The effectiveness of each intervention may depend on the baseline health status, the extent of compliance and the availability of supportive structures and commodities.

Based on the clinical implications derived from the findings, significant lifestyle changes should become part of Nigeria's public health policy to prevent CVD. Ensuring the availability of counselling on eating, safe exercise facilities, free smoking cessation, and stress management will be crucial in the value these interventions will offer the whole populace. Structural changes to these strategies to the needs and capabilities of various communities in Nigeria may add even better compliance and superior results so that the usage of those preventive instruments all over Nigeria can be optimised.

5. Conclusion

This review further confirms that lifestyle interventions, such as dietary modification, physical activity, smoking cessation, and stress management, are crucial in minimising CVD risks in Nigeria. Research studies show that it is possible to lower systolic BP by an average of 12 mm Hg and LDL cholesterol by 20 mg/dL through the DASH diet, but for specific regions and with a locally suitable diet. Likewise, physical activity and LISRAM mix include the primary prevention of decreased BP (up to 15 mm Hg) and BMI of approximately 10%, which significantly improves the cardiovascular profile. Stress management programmes, for instance, have realised a 10% lowering of blood pressure among participants, therefore playing a significant role in controlling CVD risk, which is more so in the urban Nigerian populations given the increasing stressor-related hypertension. Despite that, the general utility of these interventions faces drawbacks like socioeconomic constraints, differential food culture, and a lack of adequate health systems infrastructure. Constraints such as travel distances, limited availability of healthy foods and inadequate play areas in low-income neighbourhoods in Nigeria need to be improved for the sustainable practice of some identified lifestyle

behaviours. The potential of each intervention may be further improved by translating strategies into consideration of Nigerian diets, developing feasible exercise plans, and enhancing the client's awareness about the adverse effects and ways to quit smoking and manage stress. These issues could be resolved through multisectoral cooperation, with the government's involvement with relevant ministries, healthcare systems, and other relevant nonprofit organisations to guarantee the distribution of prevention interventions to the general public. Therefore, incorporating lifestyle interventions as additional strategies in Nigerian healthcare policies features a credible chance of reducing the burden of CVD. Suppose these interventions can be fine-tuned to the local environment and the governmental and structural support for them financially are provided. Nigeria should be able to improve its status significantly in terms of FOBT cardiovascular diseases. Further research should be longitudinal and focus on long-term compliance, best methods of delivering the interventions and larger-scale effectiveness. To some extent, lifestyle modifications can form the basis of a multisectoral attempt at the prevention of CVD in Nigeria as a nation, leading to better cardiovascular disease morbidity and a few extra years of life for millions of citizens.

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