Exercise Decisional Balance Among Persons Living with Hypertension in a South-Eastern State of Nigeria

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ABSTRACT

Background: Exercise is key in the primary prevention and control of hypertension.The exercise decisional balance (EDB) reflects the perceived benefits (pros) and perceived barriers (cons) of exercise behaviour change and predicts one's readiness to engage in exercise behaviour change. **Objectives:** To assess EDB among persons living with hypertension in Nnewi, AnambraState, and the inter-relationships among participants' anthropometrics and socio-demographics and their EDB. **Methodology:** This cross-sectional study surveyed 150 adults (109 females and 41 males) living with hypertension in the study population. Participants were conveniently recruited from teaching and specialist hospitals, markets and offices in the study area. Data was summarised using descriptive statistics. Spearman rank order correlation and Mann-Whitney U tests were used to test for relationships and influences among variables. Alpha was set at 0.05. **Results:** The participants demonstrated good EDB (2.80 ± 0.97). The mean BMI (28.78 ± 5.88), waist (93.77cm ± 12.29) and hip circumferences (108cm.10 ±13.25) of participants fell within overweight and unhealthy. Adiposity indices were significantly greater in females than in males, and showed significant negative correlations with EDB. Only 1.3% of the participants recorded negative decisional balance scores. The study observed no significant influence of gender, marital status and occupation on EDB. Age showed a significant positive correlation with Pros (r= 0.199, p=0.015) and EDB (r= 0.219, p=0.007). **Conclusion:** The majority of the participants had good EDB, though not as much reported as good enough exercise participation. Most participants were overweight, and adiposity indices showed significant negative correlation with EDB, while age showed significant positive correlation with EDB.

Keywords: Primary prevention, Blood pressure, Physical inactivity, Overweight, Lifestyle changes, Cardiovascular disease.

INTRODUCTION

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure.[1] Hypertension is the leading risk factor for morbidity and mortality, causing an estimated 9.4 million deaths globally in 2010.[2] In 2015, a 28.0% prevalence of

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Article Metrics

Submitted: *16 November 2022*
Accepted: *6 February 2023*
Published: *July-Dec. 2023*

Journal Metrics

p- ISSN: *1115-0521*
e-ISSN: *3027-2890*
Website: *www.orientjom.org.ng*
E-mail: *editorojm@gmail.com*

Publisher

cPrint, Nig. Ltd
E-mail: *cprintpublisher@gmail.com*

Access to the article

Website: *http://www.orientjom.org.ng*
: DOI: 10.5281/zenodo.7893987

How to cite this article

Amaechi A.F, Ozodi M.C, Akadieze O.A, Chukwudebelu A, Nwani O.P. Exercise Decisional Balance Among Persons Living with Hypertension in a South-Eastern State of Nigeria. Orient J Med, 2023;35(3-4):45-57. DOI: 10.5281/zenodo.7893987

hypertension was reported among a group of Nigerian adults, and projected an increase to 39.1 million cases and 30.8% prevalence in hypertension among Nigerian adults aged 20years and above.[3] Cardiovascular diseases (CVDs) such as hypertension are the leading causes of morbidity and mortality worldwide. In the United States, CVD accounts for ~600,000 deaths (25%) each year,[4,5] and despite a reported decline between the sixties to nineties, its incidence is reportedly increasing again.[6] In the past two decades, Nigeria as well as other low and middle-income countries are experiencing an incinerating increase in CVDs.[7] Among the many risk factors that predispose to the development and progression of CVDs, a sedentary lifestyle; characterized by consistently low levels of physical activity, is now recognized as a leading contributor.[8]

Regular exercise and physical activity are associated with remarkable widespread health benefits and a significantly lower CVD risk. Several long-term studies have shown that increased physical activity is associated with a reduction in all-cause mortality and may modestly increase life expectancy, an effect which is strongly linked to a decline in the risk of developing cardiovascular and respiratory diseases.[9] Acutely, exercise has been associated with immediate significant reductions in systolic blood pressure. This immediate reduction in blood pressure after exercise can persist for almost 24 hours and is referred to as post-exercise hypotension with the most pronounced effects seen in those with higher baseline blood pressure.[10] More frequent or chronic exercise results in more sustained reductions in blood pressure referred to as the exercise training response.[10] The reduction in blood pressure with physical activity is thought to be due to attenuation in peripheral vascular resistance, which may be due to neuro-hormonal and structural responses with reductions in sympathetic nerve activity and an increase in arterial lumen diameters, respectively.[11] Exercise is a key component of lifestyle therapy for the primary prevention and treatment of hypertension. A number of studies consistently demonstrate beneficial effects of exercise on hypertension with reductions in both systolic and diastolic blood pressure with as much as 5–7 mmHg reductions in those with hypertension.[12,13] Exercise maintained throughout life is associated with lower incidence and prevalence of chronic diseases such as cancer, diabetes and cardiovascular and coronary heart diseases.[14,15]

Researchers have asserted that adoption of active lifestyle programs for adults, introduction of sport/physical activity to attract inactive audiences, regular exercise prevents musculoskeletal disorders such as mechanical low back pain, neck, shoulder pain and, assist to decrease risk of developing coronary heart disease (hypertension, diabetes, osteoporosis, and obesity and colon cancers,[16,17] however an individual's decision to engage in lifestyle changes such as exercise depends on his perception of the benefits/facilitators of and barriers to engaging in such changes; the likelihood that an individual will engage in exercises depends largely on their perceived magnitude of the barriers against being physically active, and their perceived benefits to being physically active. Although the literature has reported perceived barriers to be key in predicting health behaviour.[18]

A recent research has suggested the issue to be more complex, implicating the ratio of perceived barriers to perceived benefits as being more predictive of behaviour.[19] This is to say that the ratio of perceived pros to perceived cons is a more likely determinant of the person's decision making. This is in line with the idea of the decisional balance construct of the Trans-Theoretical Model (TTM) which proposes that individuals would tend more towards making a healthy lifestyle change when their perceived benefits (pros) outweigh their perceived barriers/deterrents (cons) of such changes [20]

The Transtheoretical-Model (TTM) is one of the most widespread models used to examine the theoretical determinants of behaviour changes.[21] It is an integrative psychological framework of behavioural

change that aims to increase theoretical diversity within one's health behaviour choice and motivation. The decisional balance construct of the TTM reflects the perceived benefits (pros) and perceived barriers (cons) of varying exercise behaviour. These two factors combine to determine the relative potential gains and losses of exercise behaviour. The pros increase, while the cons decrease across the stages of change for exercise behaviour (i.e. pre-contemplation to maintenance).[22]

The decisional balance was used in several studies to understand the component and process of behaviour change in diverse populations. However, the researchers could not find studies that explored exercise decisional balance among patients with HTN. This study therefore aims to determine the exercise decisional balance among persons living with hypertension in Nnewi, an urban community in south-eastern Nigeria, as well as determine the inter-relationships between participants' anthropometrics and socio-demographics and their exercise decisional balance. It was hypothesized that there would be no significant influence, and interrelationship between participants' anthropometrics, and some socio-demographics and their exercise pros, cons and decisional balance.

METHODOLOGY

Study Design

This was a cross-sectional survey involving consecutively recruited volunteering adults living with hypertension from teaching and specialist hospitals, markets and local government offices in the study area. The data collection lasted a period of six months from 1st August 2021 to 28th February 2022. The study was preceded by recruitment and training of six research assistants selected from among undergraduate final year students of medical rehabilitation department. The research assistants were trained on how to use the study instrument and on how to carry out the different anthropometric measures and how to administer the Revised

Decisional Balance Scale.

Data was collected using a structured questionnaire. Information obtained include the socio-demographic data of participants (age, gender, marital status, etc) as well as the measurement of the anthropometric variables (weight, height, blood pressure, waist and hip circumferences) of the participants. Anthropometric variables were each measured twice and the average values of each measure recorded for each participant. The Revised decisional balance scale and a validated local language version of the revised decisional balance scale were used to assess the exercise decisional balance of the participants.The Revised Decisional Balance Scale is a nine-item two-domain self reportlikert-like measure that could also be interviewer-administered. Whether self-administered or interviewer administered the Revised Decisional Balance Scale is simple to understand and takes average of five minutes to complete.About 22% of the participants self-administered the questionnaire, while the rest preferred the researcher-administered option.

Participants and settings

The study was carried out among adults living with hypertension from teaching and specialist hospitals, markets and local government offices in Nnewi an urban community in Anambra State, South-eastern Nigeria. A sample size of 149 which had 85% power to detect a minimal difference at small effect size of 0.24 at alpha 0.05 was determined using G-power version 3.1.9.4.

Study Instruments:

Revised Decisional Balance Scale

Decisional balance was measured using the English and Igbo versions of the "Revised Exercise Decisional Balance Scales," which assess an individual's exercise decisional balance. The "Decisional Balance Scales" are well-known instruments originally conceptualised as a decisional "balance sheet" and has gone through revisions and has been proven to be useful in assessing decisional balance for behavioural changes.[23,24,25] The revised exercise decisional balance scale is a 9-item 2-domain (pros and cons domains) self-report likert-like

measure that assesses an individual's perceived pros and cons towards exercise. Each item in the scale has five choices ("not at all," "slightly," "moderately," "very," and "extremely"). The scale is scored by calculating the average scores for each domain; while the decisional balance is determined by subtracting the cons from the pros. A positive number indicates that the individual is endorsing more pros than cons for the given behaviour, and if the number is negative, the individual is endorsing more cons than pros for the given behavior.[23] Evidence from previous studies supported its psychometric properties; the Cronbach's alphas were reported at 0.79 for pros and 0.71 for cons.[23,26,27]

Test-retest study yielded reliability coefficients of 0.84 & 0.74 for the pros & cons respectively. The pros subscale reported good internal consistency alpha = 0.82, 0.83 & 0.77 at times 1, 2 & 3. The cons subscale also had adequate internal consistency alpha= 0.72, 0.69 & 0.69 at times 1, 2 & 3 The Revised Decisional Balance scale was also found to have concurrent and construct validity. Mean scores for the items are calculated: PROS [1,3,5,7,9] CONS [2,4,6,8].

Igbo version of the Revised Decisional Balance Scale.

The RDBS was translated to the Igbo language by a Graduate of Igbo, and then back-translated by two specialists to ensure that no information was lost in the process of translation. An initial pilot study with this Igbo version exhibited acceptable internal consistency shown by a Cronbach's alpha value of 0.7 for the total score. The Cronbach's alpha values for the pros and cons domains were 0.83 and 0.54 respectively which falls within acceptable range. It also demonstrated excellent known-group validity with a correlation coefficient of 0.86.

Weighing Scale

The Psalmson bathroom weighing scale model-BR9010 made in China. It is calibrated usually by applying some pressure and waiting until you see "0.0" before the participant steps on the platform. This device calibrated in kilograms (kg) and in pounds (lb) was used to measure participants' weight.

Tape Measure

An inelastic tailor's measuring tape calibrated in centimeters (cm) and inches (inch) was used to measure waist and hip circumferences of the participants.

Blood Pressure Monitor

The automated blood pressure monitor OMRON-Model KD-595 was used in measuring blood pressure of the participants in mmHg.

Height meter

A constructed height metre was used for checking the participant's height in centimetres.

Inclusion and Exclusion criteria

The inclusion criteria for this study include aged 18years and above and a diagnosis of hypertension. The exclusion criteria for this study were people living with hypertension who have communication and cognitive impairments and those that are wheelchair bound.

Ethical approval

Ethical approval was obtained from the Ethical Review Committee of Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus(NAU/FHST/2022/MRH047). Participation in the study was voluntary. Informed written consent was obtained from each participant.

Data Analyses

The analysis was done using the IBM Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics of frequency count, percentage, range, mean, and standard deviation (SD) were used to summarize participants' socio-demographic data and their scores on the research instruments. Correlations between quantitative variables were analysed using the Spearman correlation coefficient. Comparison of the values of quantitative variables in two groups was

performed using the Mann–Whitney test. Comparison of the values of quantitative variables in three and more groups was performed using the Kruskal–Wallis test. Alpha level of 0.05 was adopted in the analysis. All p values < 0.05 were interpreted as showing significant relationships. Confidentiality was ensured by using study numbers to identify each participants.

3. RESULTS

A total of one hundred and fifty individuals (27.3% males and 72.7% females) with mean age 52.65 ± 9.47years participated in the presented study. About 97% of the participants were married and 51.3% were engaged as civil servants (Table 1)

Table 1: Socio-demographic distribution of participants

Variable		Frequency	Percentage (%)
Gender			
	Male	41	27.3
	Female	109	72.7
Marital status			
	Single	5	3.3
	Married	145	96.7
Occupation			
	Trader	58	38.7
	Civil servant	77	51.3
	Driver	3	2.0
	Engineer	1	0.7
	Unemployed	6	4.0
	Bike Rider	1	0.7
	Salesman	1	0.7
	Auto-Mechanic	1	0.7
	Others	2	0.7
Educational level			
	Primary	19	12.7
	Secondary	87	58
	Tertiary	43	28.7

Mean Obesity indices, blood pressure and Decisional Balance Scores of participants. The mean BMI score of the participants was (28.78 ± 5.88). The mean waist circumference and hip circumferences were 93.77cm ± 12.29 and 108cm.10 ±13.25 respectively (Table 4.4). Participants with unhealthy weight according to the BMI category are 68.7% total (Table 2). Mean systolic and diastolic blood pressure values of the participants were 137.80 ± 20.95 and 87.34 ± 12.01 respectively. Only 1.3% of the participants recorded negative decisional balance scores, majority of the participants fell within moderate to good exercise decisional balances (Table 2). The participants had a mean EDB score of (2.80± 0.97).

Table 2: Clinical characteristics of participants

Variables		Frequency	Percent(%)
BMI			
	Underweight	1	0.7
	Normal weight	46	30.7
	Overweight	46	30.7
	Obesity I	33	22.0
	Obesity II	16	10.7
	Obesity III	8	5.3
WC Obesity			
	1.00	63	42
	2.00	86	58
WHR Obesity			
	1.00	71	47.3
	2.00	79	52.7
Anti- hypertensive usage			
	Yes	104	69.3
	No	44	29.3
	Not sure	2	1.3
Decisional Balance status			
Negative decisional balance		2	1.3
Stalemate (pros=cons)		0	0
Low positive EDB		25	16.7
Fair positive EDB		33	22
High positive EDB		90	60

Table 3 shows the exercise decisional balance scores of participants. Item 9 "Regular exercise would help me have a more positive outlook on life" recorded the best scores (extremely important) in the pros category while item 6 "I feel uncomfortable or embarrassed in exercise clothes" recorded the best scores (not important) among the cons items (Table 3).

Table 3: Exercise Decisional balance scores of participants

Items	Not Important N (%)	Slightly Important N (%)	Moderately Important N (%)	Very Important N (%)	Extremely important N (%)
I would have more energy for my family and friends if I exercised regularly	12 (8.0)	2 (1.3)	10 (6.7)	35 (23.3)	91 (60.7)
I would feel embarrassed if people saw me exercising	139(92.7)	6 (4.0)	2 (1.3)	0 (0)	3 (2.0)
I would feel less stressed if I exercised regularly	17 (11.3)	10 (6.7)	17 (11.3)	25 (16.7)	81 (54.0)
Exercise prevents me from spending time with my friends	119 (79.3)	18 (12.0)	6 (4.0)	1 (0.7)	6 (4.0)
Exercising puts me in a better mood for the rest of the day	7 (4.7)	5 (3.3)	15 (10.0)	32 (21.3)	91 (60.7)
I feel uncomfortable or embarrassed in exercise clothes	140 (93.3)	3 (2.0)	2 (1.3)	3 (2.0)	2 (1.3)
I would feel more comfortable with my body if I exercised regularly	6 (4.0)	4 (2.7)	15 (10.0)	24 (16.0)	100 (66.7)
There is too much I would have to learn to exercise	63 (42.0)	13 (8.7)	43 (28.7)	17 (11.3)	14 (9.3)
Regular exercise would help me have a more positive outlook on life	3 (2.0)	9(6.0)	21 (14.0)	1 (0.7)	116(77.3)

Age showed a significant positive correlation with perceived Pros (r= 0.199, p=0.015) and EDB (r= 0.219, p=0.007), Pros showed significant positive correlation with EDB (r= 0.850, p=0.000) and significant negative correlation WC (r= -0.193, p=0.018. Significant negative correlations were also observed between EDB and each of Cons, Body Mass Index, waist circumference and hip circumference of the participants significantly correlated with one another (p<0.05) (Table 4).

Table 4: Spearman Rank Order Correlation showing the relationship among Age, Pros, Cons,EDB and BMI, WC, HC, WHR of participants

Variable	Age	Pros	Cons	EDB	BMI	WC	HC	WHR
Age		r = 0.199 p = 0.015*	r = -0.157 p = 0.054	r = 0.219 p= 0.007*	r =-0.091 p= 0.266	r = -0.133 p = 0.104	r =-0.088 p = 0.283	r = -0.150 p = 0.066
Pros			r = -0.159 p = 0.052	r = 0.850 p= 0.000*	r =-0.074 p= 0.369	r = -0.193 p= 0.018*	r =-0.128 p = 0.120	r = -0.113 p = 0.169
Cons				r =-0.618 p= 0.000*	r = 0.192 p=0.018*	r = 0.265 p= 0.001*	r = 0.258 p= 0.001*	r = -0.079 p = 0.334
EDB					r =-0.164 p=0.044*	r = -0.289 p= 0.000*	r =-0.235 p= 0.004*	r = -0.137 p = 0.094
BMI						r = 0.756 p= 0.000*	r = 0.741 p=0.000*	r = 0.144 p=0.079
WC							r = 0.816 p=0.000*	r = 0.446 p=0.000*
HC								r =-0.086 p=0.297

**= significant at <0.05; WC= Waist Circumference; BMI= Body mass index; HC= Hip Circumference; WHR=waist hip ratio*

The study revealed no significant gender difference in the Pros (U= 2057.50, p= 0.45), Cons (U= 2217, p= 0.94), and EDB (U= 2190.50, p= 0.85) scores of the participants. Marital Status had no significant influence on the Pros (U= 201, p= 0.85), Cons (U= 333, p= 0.75), and EDB (U= 236, p= 0.18) scores of the participants. Educational level has a significant difference on the pros scores (K= 8.14, p= 0.017) of participants, but not on Cons (K= 2.25, p= 0.33), and EDB (K=2.47, p= 0.29) (Table 5).

DISCUSSION

What determines successful implementation of an exercise program for hypertensive patients are the factors that influence exercise participation themselves .[28, 29] Several researchers have demonstrated that the decisional balance measures are good indicators of health behaviours and support the use of these measures in further research to aid understanding of behaviour change in general and specific populations.[30,31] This study was designed to assess exercise decisional balance (willingness/motivation to exercise) among persons living with hypertension in the study location and to determine what interrelationship may exist among participants' sociodemographic characteristics and their exercise decisional balance. The participants of the present study demonstrated good exercise decisional balance with a mean EDB score of (2.80 ± 0.97) which translates to 70% positive scores on the EDB scale. These scores are much higher than a recent work in Jordan that found a mean EDB score of 0.81 ± 1.38 among persons living with hypertension.[32]

The mean perceived pros and cons scores found among the participants of this present study were also considerably better than the scores recorded in Jordan by Eshahet a in which mean pros scores of 3.34 ± 1.3 and cons scores of 2.53 ±0.78. [32] This study revealed good exercise decisional balance among the study participants; furthermore, only less than 2% of the participants of this present study recorded negative decisional balance while the majority of them fell within moderate to good positive decisional balance scores. However, as important as exercise decisional balance is to exercise participation, it may not necessarily always translate to or match exercise participation as was the case in the current study group; only 52.7% of the participants reported that they engage in regular exercises. This was also in agreement with a study which strongly recommended that improving health behaviour should focus not just on building perceived pros but on greatly reducing the perceived cons among the population [33] There is therefore need to focus exercise implementation interventions on addressing and debunking the perceived cons; these issues can be put in proper perspective for the population in order to achieve better action.[33]

Majority of participants in this present study were in the affirmative to the questions that, "Regular exercise would help me have a more positive outlook on life" and "I would feel more comfortable with my body if I exercised regularly". Similarly only 1.3% and 2% of participants were in the affirmative to the questions in the cons category that, "I feel uncomfortable or embarrassed in exercise clothes" and "I would feel embarrassed if people saw me exercising" respectively.This finding is similar to those of other researchers who reported that increase in regular exercise leads to a concomitant increase in positive outlook.[34, 35] These responses also demonstrate that the participants of the present study understand that exercise benefits can be appropriated to themselves, and so decisions as to whether to engage in activities that would grant such benefits should not be made based on otherindividuals. Moreso, these findings are similar to the finding that suggested that "exercise increases my level of fitness" and exercise increases my muscle strength" were among the highest perceived exercise benefits among a group of individuals with chronic conditions or physical disabilities.[36]

"There is too much I would have to learn to exercise" (9.3%) and "Exercise prevents me from spending time with my family and friends" (4%) were the most implicated cons item among the participants of the present study. This finding may explain why the high pros and exercise decisional balance scores did not exactly equate to exercise participation. It could be that despite understanding that regular physical exercises can be of significant health benefit, the participants of the present study feel that exercise has to be complex and would require them to learn new skills. It is therefore important to teach the general population that

health enhancing exercises/physical activities do not necessarily require skills and special equipments or places; increasing walking (number of steps per day) alone has been proven to impose great health benefits and requires no special skill, equipment or setting.[37,38] These findings of less exercise participation compared to the perceived pros may also buttress the findings that in Africa especially in Nigeria, there is a reasonable decrease in the level of awareness of the role of exercise in hypertension against the knowledge that increase in regular exercise leads to a concomitant increase in positive outlook.[39,40]

The current study also revealed high obesity indices among the study group; 68.6% of the participants had unhealthy BMI scores, 58% had unhealthy waist circumference values, and 52.7% had unhealthy waist-hip ratio. This finding is not entirely surprising as obesity, a major risk factor for hypertension is on the rise in the society due to sedentariness and urbanization.[41,42] Body mass index, waist circumference and hip circumference were reported in a recent systematic review and meta-analysis as independent predictors of obesity which in turn is a risk factor of hypertension.[43]

This present study also found significantly higher obesity indices (BMI and WC) values among the women compared to the male participants. Other studies have also reported higher obesity indices in women compared to men and the reasons range from cultural factors, to higher sedentariness, higher appetite for food especially sugary things in women, etc.[44,45] Furthermore, all of the obesity indices explored in this study (BMI, WC, HC) showed significant negative correlations with exercise decision balance and significant positive correlations with perceived exercise cons; showing that people who are more obese felt more averse to engaging in regular exercises which may also increase their obesity thereby establishing a vicious cycle. A recent study also reported significantly lower exercise participation scores among individuals with higher WC and BMI scores.[46] Exercise intervention targeting reduction in BMI will encourage positive change on psychological variables of exercise decision.[47]

Participants 'age showed a significant weak positive correlation with perceived Pros (r= 0.199, p=0.015) and EDB (r= 0.219, p=0.007) in this study. A previous study reported a positive association between physical activity and life satisfaction in middle and older adulthood.[48] It could be that time and experience has buttressed the importance of exercise among the older participants.[49] Another reason for this finding could be that the older participants have lesser social demands; they may not have such dire needs for time to spend with loved ones as they may not be fully engaged with occupational activities and so would likely have more time on their hands.

The study encountered more female participants than males (ratio of 2.66:1), this may support the assertion of better/higher health seeking behaviours in females as reported in a previous study.[50] Again, the correlate between Cons and BMI agreed with numerous barriers to exercise in hypertensive patients from various socioeconomic and ethnic backgrounds which have been offered to explain this phenomenon, including lack of time, physical pain, and laziness.[52] However, age was not found to have any significant correlation with perceived cons (barriers/deterrents) unlike the suggestionthat, perception of barriers to exercise varied with age.[52]

Gender and marital status had no significant influence on perceived pros and cons among these participants. However, educational level showed significant influence and surprisingly, people who had secondary school education recorded highest perceived pros scores. Although this may seem surprising as university education is meant to impact higher knowledge and better exposures, it is likely that the people who received university education make up the bulk of the civil servants and people holding white collar jobs; which would likely expose them to higher levels of sedentariness and less time for exercises and

physical activity.[53]

In the light of these findings health experts should focus on benefits of exercise in the management of hypertension and incorporate rehabilitation geared towards improving healthy waist circumference, hip circumference and the body mass index of persons with hypertension. Exercise promotion interventions should go beyond teaching exercise benefits to making provisions for actual exercise participations and demonstrating how the possible barriers can be overcome. Effort at incorporating exercise promotional activities at all tiers of healthcare delivery centres should be encouraged. Further studies to compare exercise decisional balance of hypertensive individuals and healthy population in South-eastern region of Nigeria is recommended.

CONCLUSION

Most of the participants demonstrated good exercise decisional balance, however the high exercise decisional balance recorded did not correspond with actual exercise participation. Participants actually appreciated exercise benefits and were willing to engage in exercises much more than they actually did.The majority of the participants were overweight and higher adiposity indices tended towards lower EDB scores and hence less likelihood to engage in exercises among the participants.

Contribution to knowledge

This study revealed good exercise decisional balance among the study participants in the study community which has not been previously reported in the community. The study also further revealed that good exercise decisional balance did not actually translate to better participation in the exercise activities by the participants. The need to focus on exercise implementation interventions that address and debunk the perceived cons against exercise in the community as a means of reducing the rising score of hypertension has been brought to fore by the study.

Author Contributions

Conceptualization, AIA; methodology, AIA and OCM; software, AIA; validation, AIA; OCM; formal analysis, AIA; investigation, AIA, NPO and OCM; resources, AIA, OCM and AAO; data curation, AIA, NPO and OCM; writing—original draft preparation, OCM and AAO; writing—review and editing, NPO, AIA and CEA; visualization, AIA; supervision, AIA. All authors have read and agreed to the published version of the manuscript.

Funding

This study was self-funded by the authors.

Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethical Review Committee of Faculty of Health Sciences and Technology, NnamdiAzikiwe University, Nnewi Campus(NAU/FHST/2022/MRH047).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study, after the purpose and nature of the study had been explained to them.

Data Availability Statement

The data will be available on reasonable request by contacting the corresponding author.

Acknowledgments

The Authors sincerely thank the Participants of the study.

Conflicts of Interest

The authors declare no conflict of interest.

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