

A Comparative Study of the Physiological Variables Associated with Cardiovascular Disease Risk Factors Among Retirees in Ile-Ife, Nigeria

OLUFUNMILOLA L. DOMINIC
University of Ilorin, Nigeria

ISRAEL A. OJO
LAUTECH Teaching Hospital Osogbo, Nigeria.

RUFUS ADESOJI ADEDOYIN
Obafemi Awolowo University, Ile-Ife.

Abstract. The study determined cardiovascular disease (CVD) risk factors, assessed Physiological variables and established the relationship between physiological variables and cardiovascular disease risk scores among retirees. Two hundred and three (203) apparently healthy adults, aged between 54 and 89 years with a mean age of 63.99 ± 6.70 years participated in the study. One hundred and four (104) retirees and ninety nine (99) age-matched self-employed adults were recruited. The subjects were selected from the Association of Pensioners of ObafemiAwolowo University (OAU) and OAU Teaching Hospitals Complex, Ile- Ife using purposive sampling technique. The control subjects were non-retirees but age-matched adults they were recruited from different shops, workshops and market places within Ile-Ife. Weight, height, waist circumference, systolic blood pressure (SBP) and diastolic blood pressure (SBP) were measured using standard equipment and procedures. The subjects CVD risk scores were measured based on the information from the questionnaire given to them, they were classified into high, medium and low risk based on the scores calculated from the questionnaire. Both descriptive and inferential statistics were used to analyze the data. The study concluded that the physiological variables; systolic and diastolic

blood pressure had significant relationship with the CVD risk scores, that an increase in the value of physiological variables leads to an increase in CVD risk scores, The retirees had significantly higher CVD risk scores than the controls.

Keywords: cardiovascular disease, physiological variables, retirees

1. Introduction

Cardiovascular diseases are caused by disorder of the heart and blood vessels, and include coronary heart disease (heart attacks), cerebrovascular accidents (stroke), high blood pressure [hypertension], peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure. The main causes of cardiovascular disease are tobacco use, physical in-activity and an unhealthy diet. According to World Health Organization, (WHO, (2008), cardiovascular disease (CVD) is the major health problem in the industrialized world and is the most popular cause of death in these developed nations ((Kristiansen, 2006; Petersons, 1999). In sub-Sahara Africa (SSA), CVD is not yet a major killer but the trend is changing, particularly in urban areas (Mensah, 2003; Rutledge 2003).

Cardiovascular Disease risk factors are usually traits and lifestyle practices that increase a person's chances of having coronary artery and vascular disease. Some risk factors cannot be changed or controlled (non-modifiable), while other risk factors are controllable (modifiable) such as high blood pressure, obesity, cigarette smoking, alcohol, high blood cholesterol, sedentary life style or lack of regular exercise, diabetes mellitus and wrong diet. The uncontrollable ones are age, gender and heredity. The most important risk factors are high blood pressure; high blood cholesterol and cigarette smoking (Cardiovascular Rehabilitation Program (CRP), 2008). Other factors that may increase risk for cardiovascular disease are diabetes, obesity or overweight being inactive and having an unhealthy reaction to stress (CPR, 2008).

According to Torpy (2003), a risk factor is something that makes one more likely to have a disease, illness, or medical problem. Some risk factors are modifiable (can be made better) other risk factors, such as age and genetics (family history) are non-modifiable (cannot be changed).

Retirement is the point where a person stops work completely (or decides to leave the labor force) after attaining certain age (60 years above)(Ogunbameru&Bamiwuye,2004). A person may also semi-retire by reducing work hours or keep some sort of retirement job out of choice rather than necessity. Many people choose to retire when they are eligible for private or public pension benefits, although some are forced to retire when physical conditions do not allow the person to work anymore (by illness or accident). Previously life expectancy was low and the absence of pension arrangements meant that most workers continued to work until death (Raphael, 2011). Nowadays most developed countries have systems to provide pensions retirement in old age, which may be sponsored by employers and/or the state. In many poorer countries, support for the old is mostly provided through family. Today retirement with a pension is considered a right of the worker in many societies, and hard ideological, social, cultural and political battles have been fought over

whether this is a right or not. In many western countries, this right is mentioned in national constitutions (BBC News, 2010;Bucci, 1992).Ogunbameru et al (2004) view retirement as a passage that can result in psychological, physiological and economic problems.

Retirees in Nigeria are known to be less catered for by the employers in terms of payment of benefits after retirement. It is generally observed that they are usually made to pass through intense verification exercises, which are stressful to elderly persons. It is not known which factors place the retiree to high CVD risk among the retirees in Ile- Ife Nigeria.

2. Statement of the Research Problem

The researcher observed a constant increase in the incidence of CVD conditions among retirees unlike their age-matched adults and he desire to know what factor is responsible. It is also documented that the incidence of CVD in Sub-Sahara Africa is going higher daily (Yusuf et al 2001), it is a fact that retirees in Nigeria are faced with many thought-provoking and emotional disturbances, which can be due to delay or denial of their retirement benefits after an active service and accentuated by age. Sonja, Jan and Seven-Erik, (2000) stated that retirees have a disadvantage risk profile for cardiovascular disease among elderly migrants in Sweden. Adedoyin et al (2006) assessed cardiovascular risk among the people of a Nigeria University community and that study was focused on the staff and students of the University community and found that staff of the university was at higher risk of CVD than the students, hence the need to assess CVD risk among the retirees in the same community. The incidence of cardiovascular disease (CVD) among retirees in Ile-Ife is rising (Adedoyin et al 2005). Murray and Lopez (1997) stated in their study that while the incidence of CVD is decreasing in many high income populations, its incidence in low income populations is growing.

Furthermore studies have shown that sedentary life-style has harmful effect on the cardiovascular system (Warren, Barry, Hooker, Sui, Church, & Blair, 2010). It is not known

what effect sedentary life-style coupled with the stress of mandatory retirement verification exercises has on the retiree's population. Also physiological variables may also have relationship with the risk for CVD. Studies on the risk of CVD among retirees may provide outcome that could be useful to combat CVD among this particular group. This served as impetus for this study. This study was therefore designed to establish the relationship between physiological variables and the risk of CVD among the retirees in Ile- Ife.

3. Hypotheses

- (i) There will be no significant difference in the risk factor score of the retirees and control subjects.
- (ii) There will be no significant relationship between physiological variables and the cardiovascular parameters of retirees.
- (iii) There will be no significant difference in the risk factor score between male and female retirees.
- (iv) There will be no significant relationship between cardiovascular risk score and age of retirees.

4. Materials and Methods

This study was conducted among retirees of Obafemi Awolowo University [OAU] Ile-Ife and Obafemi Awolowo University Teaching Hospitals Complex [OAUTHC] Ile-Ife. One hundred and four (104) retirees participated in this study. The sample consisted of 53 males and 51 females whose ages ranged from 55 to 89 years. They are retirees resident in Ile-Ife. The control group consisted of ninety-nine (99) age matched individuals that is either self-employed or still in active service. They were recruited from different shops, workshops, business centers and trading places within Ile-Ife.

5. Site of the Study

The study was conducted at the ObafemiAwolowo University Teaching Hospital Complex and ObafemiAwolowo University campus Ile-Ife. All measurements were taken

within the premises of Pensioner Association Secretariat, OAU chapter at Lagere and OAUTHC, Ile-Ife.

6. Procedure

Ethical clearance for the study was sought and obtained from the Ethical and Research Committee of ObafemiAwolowo University Teaching Hospitals Complex, Ile Ife.

All measurements were taken within the premises of Pensioner Association Secretariat of O.A.U retirees at Lagere Ile-Ife and OAUTHC Ile-Ife. Collection of data was obtained through various visits to the retirees meeting places. Visits were made between the hours of 10am – 12 noon. 53 male and 51 female retirees participated in the study. The control participants were recruited using purposive sampling technique within Ile-Ife town. They were recruited from various business centers in Ile-Ife.

Each of the participant's consent was sought and obtained before taking the measurement. Questionnaire was administered to the participants. Blood pressure was measured using the electronic blood monitor kit (Omron; Omron Healthcare, inc, 300 Lake view Parkway, Vernon Hills, IL 60061, USA) (Plate 2). Measurements were taken using standard procedure. In a pilot study, there was good agreement between the readings of the automatic device and the measurement obtained from the conventional mercury sphygmomanometer. ($r = 0.99$)

Height was measured using a validated standimeter. Weight was measured with a weighing scale in kilograms. Waist circumference was measured using tape measure; the level of navel was used as the reference point. Age, sex, medical history (history of diabetes), physical activities and lack of leisure time were also recorded.

Data collected were analyzed using appropriate statistical analysis such as descriptive (range, mean, median mode and standard deviation), Also inferential statistics were used which are Student t-test to compare the Physiological variables and CVD risk scores obtained from the

retirees and control participants. Spearman’s correlation coefficient was used to find the relationship between the Physiological variables and CVD risk scores. The Statistical Package for the Social Sciences (SPSS) statistical software (version 16) was utilized for data analysis on a Microsoft windows Dell laptop. Significance was set at 0.05 confidence level.

7. Results

7.1 Description of the Physical characteristics of the participants

The participants were between the ages of 54 and 89 years. The mean age of the experimental group (retirees) was 63.06(±6.1) years while that of the control group was 63.8(±5.9) years. The number consisted of 53 male retirees, 49 female retirees and control group consisted of 51 males and 48 female adults total number of participants were 203. The result of independent t- test shows that there was no significance difference between the experimental group age and the control (t- cal=-0.94;pvalue= 0.07)

The height of the subjects ranged from 1.30 to 1.87 meters. The mean height was 1.65(±0.075)

meters. The mean height for male and female experimental group (retirees) are 1.70(±0.09) meters and 1.65(±0.08) meters the mean height was 1.65(±0.08) while that of control male and female are 1.67(±0.06)meters, 1.62(±0.07)meters respectively. Their weight ranged from 48 kilogram to 120 kilogram (kg) and the mean weight was 73.90(±10.55). The mean weight for male and female retirees was found to be 70.55(±10.95) kg and 78.37(±8.77) kg and the control male and female were 74.25 (±9.75) kg and 72.77 ±(11.43) kg respectively. Their body mass index (BMI) ranged from 15.6 to 43.5 kilogram/meter² (kg/m²) and the mean was 26.82(±4.2)(kg/m²). The average BMI for male and female experimental group (retirees) were 24.35(±4.26) and 28.86(±3.50) respectively while that of control male and female were 26.66(±3.77), 27.54(±4.20). The waist circumference (Wst.cir) of the subject ranges from 57.0 to 117.0 centimeters also the mean waist circumference is 89.45(±12.4). The experimental group male and female waist circumference was found to be 90.52(±12.31) and 95.58(±13.58), while that of the control male and female to be 86.79(±11.97) and 84.97(±11.40) respectively.

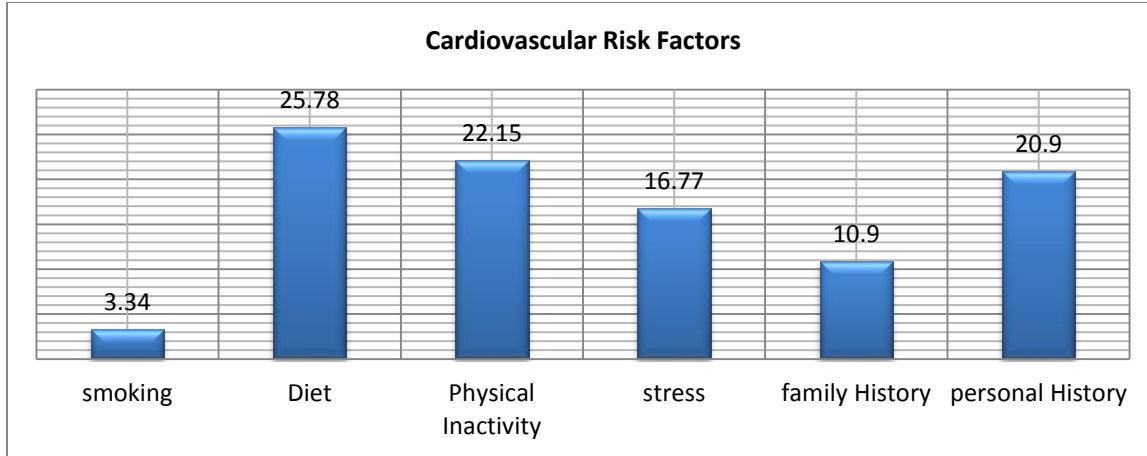
TABLE 1
Mean Score and Percentage of Cardiovascular Risk Factors

Variable	Low	High	TRscore	Average Rscore	Percentage
Smoking	3	6	59	3.68	3.34%
Diet	2	8	455	4.6	25.78%
Exercise	2	4	391	3.10	22.15%
Stress	2	4	296	2.9	16.77%
Family Hx	6	12	194	10.2	10.9%
Personal Hx	10	20	370	14.8	20.9%

Hx= History High= High risk
TR score= Total risk score. Low = Low risk
Factors Associated With Cvd Risk

Table 1 Shows that diet had the highest total risk scores (TRS) 455(25%) followed by lack of regular exercise TRS=391(22.15%), personal history of CVD TRS=370(20.9%), stress

TRS=296(16.77%), family history of CVD TRS=194(10.2%) and smoking TRS=59(3.34%).



COMPARISON OF PHYSIOLOGICAL VARIABLES AND CVD RISK SCORES OF ALL SUBJECTS (EXPERIMENTAL AND CONTROL GROUPS)

Table 2

Variables	Experimental grp. Mean (SD)	Controlgrp. Mean(SD)	t- cal	p value
SBP(mmHg)	142.79±16.69	130.15±14.49	5.74	0.001**
DBP(mmHg)	88.99±11.53	78.97±11.60	6.16	0.001**
CVRscores	22.31± 3.21	10.09± 7.76	1.49	0.010**

SBP= Systolic blood pressure; DBP=Diastolic blood pressure; CVRisk=Cardiovascular Risk mmHg= millimeter mercury. **** Significant at P≤0.05**

Table 2, shows the result of t-test comparison among retirees and control group. , SBP, DBP, CVrisk differed significantly between the retirees and control group with the retirees having higher values in SBP,DBP, and CVD risk scores. (SBP t=5.12;p=0.001), (DBP t=5.74;p=0.001), (CVDrisk t=7.54;p=0.001).

TABLE 3.

RELATIONSHIP BETWEEN CARDIOVASCULAR VARIABLES AND CARDIOVASCULAR RISK SCORE OF ALL THE SUBJECTS

Variables	Correlation	P-value
For Experimental group		
SBP (mmHg)	0.558	0.001
DBP (mmHg)	0.510	0.001
For Controlgroup		
SBP (mmHg)	0.448	0.02
DBP (mmHg)	0.395	0.003

*Correlation is significant at P≤0.05 level.

**Correlation is significant at P≤0.01 level.

SBP-systolic blood pressure; DBP- diastolic blood pressure

The result of correlation table 3 shows a significant relationship between diastolic blood pressure and CVD risk scores of retirees. ($p=0.001$); also with systolic blood pressure ($p=0.001$) among the retirees. Among the non-retirees there was a significant relationship between SBP, DBP and CVD risk score ($p=0.02$ & $p=0.003$) respectively. The analysis revealed significant differences among the participants in the four groups ($p<0.05$) compared.

8. Discussion

The main objective of this study was to explore the relationship between Physiological variables and CVD risk among retirees in Ile-Ife. The result reported a significant relationship between the various physiological variables and CVD risk score. A significant increase in physiological variables (systolic and diastolic blood pressure) resulted in an increase of CVD risk scores generally among retirees and their age match control which is in line with the findings of Adrian et al, (2010) who reported that people with occasionally high blood pressure are more at risk of stroke which is a cardiovascular disease.

There was a significant difference in the CVD risk scores between retirees and control (non-retirees) subjects; the retirees were found to have higher CVD risk scores. This was probably due to the reduction in the activities of most retirees after disengaging from active public service unlike the controls that were the same age but were more active in their personal businesses. It agrees with the findings of Sonja et al (2000). In their study, it was discovered that retirees have a disadvantage risk profile for cardiovascular diseases.

This study revealed that there was significant difference in systolic and diastolic blood pressure (SBP and DBP) of male and female retirees. The female retirees having higher mean values than the male retirees. This disagrees with the findings of Craig (2007), that women developed high blood pressure less frequently than men. Also in Daniel (2006) study, it was stated that men normally have slightly higher BP

than women. Meanwhile, the control male SBP and DBP were significantly higher than those of their female counterparts in agreement with the study of Craig (2007) and Daniel (2006). This may be interesting to mean that retirement reduces the female physical activity, while male may continue.

Result of this study also showed a significant difference between the Physiological variables (systolic and diastolic blood pressure) of retirees and non-retirees. This was likely due to more active lifestyle of non-retirees compared to the retirees who are the same age but were less active. The retirees had higher systolic and diastolic blood pressure (physiological variables). This agrees with the study of Ekerdt et al (1984) that there is a relative significant difference in the blood pressure of retirees compared with their age-matched peers who remained employed at both measurement times.

Furthermore, in this study, the result showed significant relationships between the systolic, diastolic blood pressure and CVD risk scores of all the participants, a relative increase in blood pressure led to an increase in CVD risk factors score. Adrian et al, (2010) reported that people with occasionally high blood pressure are more at risk of stroke.

The result of the study shows that few of the retirees were in the high-risk category (14.6 %) while many were in medium risk (41.3%) and low risk (44.1%). The percentage of high-risk category found in this study was higher than the one reported among the workers in similar environment (Adedoyin et al, 2006). Generally, large numbers of non-retirees (87.9%) are at low risk while some (11.1%) are at medium risk category. Only 1% is in the high risk. The reason for the reduced high risk may be that they were more active with physical activity.

The most common cardiovascular risk factor was poor diet (25.78%). This study revealed that many participants had CVD risk due to wrong diet and bad cholesterol in their diet followed by lack of regular exercise (22.15%). Exercise being one of the major ways to burn excess fat and bad

cholesterol was lacking this could explain why 58% of the retirees were in high and medium risk category unlike their age-match non-retirees counterpart.

9. Conclusion

This study concluded that there was a significant relationship between physiological variables (Systolic and diastolic Blood Pressure) and cardiovascular risk scores which was showed in the study that an increase in the value physiological variables leads to an increase in CVD risk scores, so physiological variables such as systolic and diastolic blood pressure can be used to predict if someone is at risk of having CVD.

1. Study Implication

The implication of this study is that retirees tend to be less physically active and tends towards sedentary lifestyle, a major factor for hypothetic disorders. There is the need for retirement physical literacy (education) in order to prevent development of cardiovascular risk factors leading to diseased / aging.

2. Recommendations

- (i) Physiological variables (systolic and diastolic blood pressure) should be used to evaluate cardiovascular disease.
- (ii) Retirees should be encouraged to be checking their blood pressure regularly.
- (iii) Retirees and elderly Nigerians should be educated on the right diet to take.
- (iv) More studies that will cover large number of participants are recommended.
- (v) Other factors that contribute to the risk of having CVD should be explored by interested researcher.

References

- Adedoyin, R. A., Balogun M. O, Adekanla A A, Oyebami M.O, Adebayo R.A and Onigbinde T. A. (2006) Assessment of cardiovascular Risk among the people of a Nigerian University Community.
- Journal of European Society of Cardiology*, 1714.
- Adrian, H. & Rothwell, P. (2010) <http://salud.momento,24.com/en/2010/0312/blod-pressure-a-risk-factorforcardiovascularisease>.
- Balogun, J. A., Obajuluwa, V. A., Abereje, O. K., Oyeyemi ,A.Y., Balogun, M. O. & Adeodu O. O. (1990). Anthropometric determinants of resting blood pressure and heart rate of Nigerian school children, *Annals of tropical Peadiatrics*. 10, 425-431.
- Bucci, M. (1992). Police and firefighter pension plan, *Monthly Labor Review* 115 (11) Retrieved 2007-08-03.
- CECO (2005). Ageing and Employment Policies. Australia.
- Craig, W. (2007). Women and High blood pressure; <http://highbloodpressure.about.com/od/informationforwomen/p/hbpw.pro.htm.March>
- CRP (2008). Cardiovascular Disease Risk Factors; Cardiovascular Rehabilitation program's. this State University Medical Centre – Publication's 2058
- Daniel, T. O. & Conor, M. D. (2006). Surprising interaction between Gene, Gender, and Hypertension. <http://www.medicalnewstoday.com/article/5927> 8.php.
- Ekerdt, D. J., Sparrow, D., Glynn, R. J. & Bosse, R. (1984). Change in blood pressure and total cholesterol with retirement., *Pub Med AMJ Epidemiol*. 120 (1) 64-71.
- Kristensen, P., L, Niels, W., Nielsc, M., Lars, B., Andersen, C., N. B. & Karsten, F. (2006). Tracking and Prevalence of Cardiovascular Disease risk factors across socio-economic classes. A Longitudinal substudy of the European youth Heart study *BMC Public Heart* 6:20, dvi 10:118611471 – 245B/6/20 <http://www.wikipedia.org>.
- Mensah, G. A. (2003). Health and 'Stroke – free' world through policy development systems changing, and environmental supports: A 2020 vision for sub-Saharan Africa *Ethnicity and Disease* 2003, 13:4-12.

- Ogunbameru O. A., Bamiwuye S (2004). Attitudes toward Retirement and Pre-retirement Education among Nigerian Bank Educational Gerontology, 30 (5), 391 – 401.
- Ogunbameru, O. A. & Bamiwuye, S. (2004). Attitudes toward Retirement and Pre-retirement Education among Nigerian Bank Educational Gerontology, 30(5), 391 – 401.
- Petersons, M. C. & Rayners, M. (1999). Coronary heart disease statistics. British heart foundation statistics database 1999. London British Heart foundation, 1999
- Raphael, M. (2011) “ Spain to Raise Retirement Age to 67 The New York Times.
- Rutledge T, Rela S. E. & Oscon, M. (2003). Metal Socioeconomic status variables predict cardiovascular diseases risk factors and prospective mortality risk among women with chest pain. The wise study behave modify 2003 27:54 – 67.
- Sonja, P., Jan, Sundqurst & Seven-Erik J. (2000). Major risk factors for cardiovascular disease in elderly migrants in Sweden. *Journal of Ethnicity and Health*, 5 (2), 137 – 150.
- Sung, R. Y., Yu, C. C., Choi, K. C., McManus, A., Li. A. M., Xu, S. L., Chan, D., Lo, A. F., Chan, J. C. & Fok, T.F. (2007). Waist circumference and body mass index in Chinese children; cutoff values for predicting cardiovascular risk factors. *Int JObes (Lond)*.31(3);550-8.
- Tatiana, Y., Warren, M. S., Vaughn, B., Steven, P., Hooker, X. Su,i M. D., Timothy S. & Steven N. (2011). Sedentary Behaviors increases Risk of Cardiovascular Disease Mortality in Men *Journal of Medical Science Sports Exercise* 42(5): 879-665.
- Torpy, (2003), Risk Factors for Heart Disease, The Journal of the American Medical Association (JAMA);August 20, 2003 290(7)9
- WHO (2008). Strategic priorities of the WHO Cardiovascular Disease programme 2F ward health organization.
- Yang L, Kuper H, Weiderpass E. (2007),Anthropometric characteristics as a predictor of Coronary heart disease in women. *Journal of Internal Medicine*. dip:10.1111/j.1365-2796-01907.