ASSESSMENT OF THE IMPACT OF FITNESS COMPONENT STATUS USING THE RESTING HEART RATE (RHR) AND SYSTOLIC BLOOD PRESSURE (RSBP) ON THE RELATED HEALTH CHALLENGES OF THE STAFF MEMBERS OF THE FACULTY OF EDUCATION IN UNIVERSITY OF UYO.

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ABSTRACT

The study assessed the impact of fitness component status using the resting heart rate (RHR) and systolic blood pressure (RSHP) on the related health challenges of the staff members of the faculty of education in university of uyo.Ex post facto survey design was used for the study. The study was conducted in the University of Uyo community is in Akwa Ibom State. The population of the study comprised the males and females of the Faculty of Education of the University. A sample size of 82 staff members of the Faculty of Education, comprising 42 males and 40 females were used for the study. Standard-constructed instruments were adapted and used to measure the body weight, standing height, heart rate and blood pressure as done by some notable authors The instruments for the study was a standardized questionnaire titled: Fitness Component Status Using the Resting Heart Rate (RHR) and Systolic Blood Pressure (RSBP) Questionnaire (FCSRHRSBPQ). The consistency of the instruments was certified reliable at 0.9. The data collected on the subjects were treated with the descriptive statistics to obtain the answers the research questions. The Z-test statistics was used to treat the hypotheses, set at probability significant level of .05.The study concluded that there is a significant gender difference in the fitness component status using the Resting heart rate (RHR) values among the Education Faculty staff members. On the average, the males were fitter in fitness component status by RHR than their female counterpart; as the females have significantly faster RHR values than their male counterparts. There is no significant gender difference in the fitness component status using the means of Resting systolic blood pressure (RSBP) among the Education Faculty staff members. On the average, the males were not fitter in fitness component status by the RSBP values than their female counterparts. One of the recommendations made was that the staff should be enlightened to check their BMI, heart rate and blood pressure measurements from time to time to ensure that they subject themselves to ideal weight class to avoid the related health challenges.

Keywords: Fitness Component, Heart Rate (Rhr) and Systolic Blood Pressure (Rsbp) Health Challenges and University Of Uyo.

INTRODUCTION

Body fitness has long been a strong index in assessing human performance and serving as the diagnostic measure of poor performance (Hassanein, 2015). According to the author fitness denotes the ability to work effectively without too much stress and this is determined by the level of muscular effort. The physiologist had long submitted that perfect muscular effort is from adequate functioning of the cardio-vascular system that supplies nutrients and oxygen to the working muscles. He had shown that tests of speed, agility, endurance, coordination, reaction time, strength and flexibility cannot predict or show how much health challenges a staff should have to attract medical attention. Such results can only compare the levels of performance ability and not types and levels of health challenges. The need, in such a sedentary group, according to sports medicine test-information, is not to avoid tests of muscular tasks of limbs but to go directly to the energizing system which involves the heart and blood system (which is the cardiovascular fitness system). The cardiovascular fitness components, where the heart and the blood systems are examined, are therefore medically, one of the best diagnostic approaches in ascertaining body fitness components that can be accompanied readily with expected health challenges

A number of investigations from Subramanian*et al.* (2018); Deswal and Bozkurt, (2016);Kadiri and Salako (2015) have indicated that faster resting heart rate has emerged as a new risk factor for mortality in homeothermic (warm-blooded) mammals resulting in cardiovascular mortality in human beings. According to these investigators, faster heart rate may accompany increased production of inflammation molecules and increased production of reactive oxygen in the cardiovascular system, in addition to increased mechanical stress to the heart.

All body fitness components' tests are physiologically geared towards the assessment of how the heart and blood circulatory system work effectively and efficiently in supplying energy to the working muscles. For those adults found to be sedentary, assessment of their heart (heart rates) and blood circulation (blood pressures) are considered a medical diagnosis for health challenges in the performance and fitness of the heart and the circulation of blood along the vessels.

The University of Uyo is an academic community to which staff members' body dispositions and health statuses should be of great concern to the authorities. There are a number of researchers on gender differences in many aspects of health challenges (Rosenberg, 2010; Sandberg, 2012). Though some specific health challenges are respectively for men and for women, there are those health challenges common to both gendersthat need to be investigated among the members of the University environment. Finding the gender differences among the staff members of the Faculty of Education of the University will go a long way in to determining which gender is more affected by the health challenges related to body structure and fitness capability of their cardiovascular system.

STATEMENT OF PROBLEM

It is assumed that some health issues arising from poor body types, excessive body mass and poor body fitness may not be known to the Faculty of Education staff members and

those who might know may not understand the risk factors inherent in their health conditions. Medically, high blood pressure is found to be a 'silent killer', as it may not show symptoms and signs readily for immediate remedial or curative attention. It is a part of the health problems of cardiovascular fitness of the body. Researchers have shown that uncontrolled high blood pressure can lead to complications including heart attack or stroke, heart failure, weakened and narrowed blood vessels in the kidneys; thickened, narrowed or torn blood vessels in the eyes; metabolic syndrome; trouble with memory or understanding and dementia. Since high blood pressure goes along with heart rate as correlates in the cardiovascular system, testing and measuring the staff members become necessary to help them know their health status and the accompanying health challenges if any. Prevention is a cardinal measure to maintaining good health and medical testing and measurement of the vital organs of the body, like the heart rate and blood pressure to ascertain their fitness, will always be a welcome development to keep staff members healthy. The fitness status of staff members also would determine their productivity level. Some of the effects of lack of fitness include sickness, with related health challenges resulting in absenteeism, visits to health centres and hospitals for medical attention. It is assumed that the staff members may not know their heart rate and blood pressure statuses, together with their somatotypes, as no known research in this direction has been reported before.

RESEARCH OBJECTIVE

- 1. The gender difference in the fitness component status using the resting heart rate (RHR) and the related health challenges among the staff members of the Faculty of Education.
- 2. The gender difference in the fitness component status using the resting systolic blood pressure (RSBP) and the related health challenges among the staff members of the Faculty of Education.

RESEARCH QUESTION

- 1. What is the gender difference in the mean of fitness component status using the Resting Heart Rate (RHR) and the related health challenges among the staff members of the Faculty of Education?
- 2. What is the gender difference in the mean of fitness component status using the Resting Systolic Blood Pressure (RSBP) and the related health challenges among the staff members of the Faculty of Education?

RESEARCH HYPOTHESIS

- 1. There is no significant gender difference in the mean of fitness component status using the resting heart rate (RHR) and the related health challenges among the staff members of the Faculty of Education.
- 2. There is no significant gender difference in the mean of fitness component status using the resting systolic blood pressure (RSBP) and the related health challenges among the staff members of the Faculty of Education.

CONCEPTUAL REVIEW

FITNESS COMPONENT BY HEART RATE EXAMINATION

Rosenberg, 2010 defines the heart rate (HR) or pulse as the number of times the heart beats per minute. One of the measures of body fitness is the efficient working of the heart. The heart is a pumping organ that pushes the blood as it beats into the vessels and veins of the blood circulatory system. There are three general ways to classify heart rate for diagnostic purposes; these are slow, normal and fast heart rates.

- i. A resting heart rate is normal between 60 100 beats per minute (bpm).
- ii. A resting heart rate is fast at greater than 100 bpm and is called Tachycardiac rate.
- iii. A resting heart rate is **slow** when it is below 60 bpm and is referred to as Bradycardiac rate.

However, according to Maas and Appelman (2010) trained athletes in endurancedemanding sports can have Bradycardiac rate down to 45 bpm. For the non-athletes and the physically inactive (sedentary) people, such a bradycardiac heart rate is an abnormal one as it lowers blood pressure and is referred to as "RelativeBradycardiac". Relative bradycardiac rate is used for the heart rate that though actually below 60 bpm, is considered too slow for the individual's current medical condition. The normal resting heart rate is a basic indicator of a healthy heart and has a strong relationship to body fitness. The heart rate can fluctuate based on temperature, anxiety, exercise, stress, caffeine, time of day and body position. The fluctuations and wide range of values in a healthy population can mean a measure of cardiovascular fitness.

Individuals leading more sedentary lifestyles also called by physiologist as "hypokinetic existence" tend to have higher heart rates because their hearts are less efficient. Resting heart rate is one of the most trainable areas of physical health. To lower this value, the heart must be trained on as any other muscle. Aerobic exercises demand more blood to travel to the muscles and throughout the body at a higher rate. The heart will gradually adapt to these higher volumes of blood needed by pumping more blood in every beat. Working efficiently to send out higher volumes of blood means less beats are needed which lowers the heart rate at resting state. It is by the same way that blood pressure will be lowered as well.

The American Heart Association (AHA, 2020) recommends that individuals should engage in at least 150 minutes of moderate aerobic exercise every week. Exercising 3 to 4 times a week can lower resting heart rate and blood pressure and risk of heart attack. Heart rate can be measured manually by use of stethoscope and counting the pulse at the designated pulse pressure points commonly on the inner left wrist below the base of the thumb, the side of neck and near the ear lobe.

FITNESS COMPONENT BY BLOOD PRESSURE EXAMINATION

A number of experts in this area (Maas and Appelman, 2010; Patwardhab and Tillu, 2015; and Sandberg, 2012) submitted that Blood pressure is the force by blood due to its movement against the wall of the blood vessels and is measured in milliliters mercury (mm. Hg.). It is a condition in which the force of the blood against the artery walls is too high.

Usually hypertension is medically defined as blood pressure above 140/90 mm. Hg, and is considered severe if the pressure is above 180/120 mm. Hg. High blood pressure often has no symptoms. Over time, if untreated, it can cause risky health conditions, such as heart disease and stroke. When blood pressure is measured by a sphygmomanometer, the top number is the systolic and the bottom number is the diastolic blood pressure numbers when the heart beats (contracts), as it squeezes and pushes blood through the arteries to the rest of the body. The force that creates pressure on the wall of the blood vessels is the systolic blood pressure.

A normal blood pressure (also called monotension) is below 120/80 mm.Hg. A reading of systolic 120 to 129 is elevated. From 130 to 139 is a stage of high blood pressure also known as hypertension stage 1). From 140 to 120 is hypertensionstage2, and 180 or more would be critical for immediate hospitalization, or calling for the hospital service.

The diastolic blood pressure reading or the bottom number is the pressure in the arteries when the heart rests between the beats. From the beginning to the end of one beat is the Cardiaccycle. In between the two beats is a resting period for the heart. When the heart rests (diastolic) between the beats, the heart is filled with blood and gets oxygen to function.

A normal diastolic blood pressure is lower than 80. One can still have an elevated blood pressure if systolic reading is 120 -129. Hence, for the diastolic values 80-89 is stageIhypertension, 89 or more is stage2hypertension and from 120 up would also need hospitalization or calling the hospital service.

For the purpose of the study stages 1 and 2 hypertension will be grouped together as hypertension which is emboldened, while elevated blood pressure is italicized (Table 2.2. at Appendix VI). Hence physiologists Maas and Appelman (2010), Patwardhab and Tillu (2015), and.Sandberg (2012), have found the need to examine the heart rate and blood pressure of the sedentary people as a test of their cardiovascular fitness component as one of the vital fitness components of an individual. Providing such information to the University staff members considered to be sedentary persons is needful to them to face their health challenges.

GENDER DIFFERENCE IN HEART RATE AND HEALTH CHALLENGES

Subramanian*et al.* (2018) in the assessment of heart rate variability for different somatotype category among adolescents attempted in examining the relationship between BP and specific components of body morphology, such as obesity, a more generalized approach to body types (somatotypes) was also attempted. Thus, the interrelationship between Heath-Carter (H-C) somatotypes for example, reported that while arterial hypertension was encountered in 31% of subjects in their endomorphic and mesomorphic groups, none of their ectomorphic subjects had elevated arterial pressure.

Koleva*et al.*(2002), using cluster analysis, demonstrated that men and women with the highest endomorphy and mesomorphy and the lowest ectomorphy, comprised a category of individuals who suffered most frequently from arterial hypertension. The study included 250 men and 250 women aged 44.76 \pm 11.21. Metabolic status was assessed according to IDF criteria, while somatotype was obtained using the Heath and Carter

method. Accordingly, the prevalence of arterial hypertension increases of consistently on passing over from asthenia (tall persons with long extremities and small amount fat) to hypersthenia (persons with a robust body and short extremities).

Maas and Appelman (2010), had investigated thegender differences in coronary heart disease. They noted cardiovascular diseases develop 7 to 10 years later in women than in men and is still the major cause of death in women. The risk of heart diseases in women was often underestimated due to the misperception that females are 'protected' against cardiovascular disease. They also noted that recent data from the National Health and Nutrition Examination Surveys (NHANES) have shown that over the past two decades the prevalence of myocardial infarctions has increased in midlife (35 to 54 years) women, while declining in similarly aged men- The under-recognition of heart diseases and differences in clinical presentation in women lead to less aggressive treatment strategies and a lower representation of their cardiovascular risk factors needs more attention, which should result in a better prevention of cardiovascular events. In the review they summarized the major issues that are important in the diagnosis and treatment of coronary heart disease in women.

GENDER DIFFERENCE IN BLOOD PRESSURE AND HEALTH CHALLENGES

Everett and Zajacova (2015) investigated gender differences in hypertension and hypertension awareness among 850 young adults. They asserted that hypertension is a leading risk factor for cardiovascular and cerebrovascular disease and mortality. They noted that despite decades of public health education, hypertension awareness remains problematic, with only about two-thirds of adults and the elderly aware of their hypertension status. They said while hypertension prevalence is highest in older populations, almost 20 percent of young adults are hypertensive and few studies, however, have examined gender differences in hypertension or hypertension awareness among young adults and the determinants of these differences. The authors noted that that men have higher levels of hypertension and lower levels of hypertension awareness than women, but it remains unclear if these differences emerge among young adults. Using the National Longitudinal Study of Adolescent to Adult Health (Add Health), the study examined gender differences in hypertension and hypertension awareness among U.S. young adults, with special focus on factors that may contribute to observed disparities (N = 14,497). Their results showed that the gender disparities in hypertension status were already evident among men and women in their twenties: women were far less likely to be hypertensive compared to men (12% vs. 27%). The results also revealed very low levels of hypertension awareness among young women (32% of hypertensive women were aware of their status) and even lower levels among men (25%). Finally, the study identified key factors that contribute to these observed gender disparities. In particular, health care use, while not related to the actual hypertension status, fully explains the gender differences in hypertension awareness. The findings thus suggest that regular medical visits are critical for improving hypertension awareness among young adults and reducing gender diasparities in cardiovascular health.

Everett and Zajacova (2015) again in the same research examined gender differences in measured and self-reported hypertension. The results using objectively measured blood

pressure show that young women are significantly and substantially less likely to be hypertensive than men, with 27 percent of men in their late twenties being hypertensive compared to just 12 percent of women overall.

METHODOLOGY

Ex post facto survey design was used for the study. The study was conducted in the University of Uyo community is in Akwa Ibom State. The population of the study comprised the males and females of the Faculty of Education of the University. A sample size of 82 staff members of the Faculty of Education, comprising 42 males and 40 females were used for the study. Standard-constructed instruments were adapted and used to measure the body weight, standing height, heart rate and blood pressure as done by some notable authors The instruments for the study was a standardized questionnaire titled: Fitness Component Status Using the Resting Heart Rate (RHR) and Systolic Blood Pressure (RSBP) Questionnaire (FCSRHRSBPQ). The consistency of the instruments was certified reliable at 0.9. The data collected on the subjects were treated with the descriptive statistics to obtain the answers the research questions. The Z-test statistics was used to treat the hypotheses, set at probability significant level of .05.

RESULTS AND DISCUSSIONS

Research Question 1: What is the gender difference in the mean of fitness component status using the Resting Heart Rate (RHR) and the related health challenges among the staff members of the Faculty of Education?

Gender	Ν	X	SD	Results
Males	42	79.3 bpm	18.2	Males have lower RHR
Females	40	101 bpm	9.2	value.

Table 1: Descriptive Statistical Analysis of Gender Difference in Means of RHR.

Source: Appendix IV

Result: In Table 1, the males have a mean RHR value of 79.3 bpm while the females have a mean RHR value of 101 bpm. The result is that the males have lower RHR value than their female counterparts.

	FITNESS STATUS	MALES:	FEMALES:
	BY RHR	N = 42	N = 40
	x -	79.3 bpm	101 bpm
	SD -	18.2 bpm	9.2 bpm
	NORMAL HRH	26 (32.5%)	17 (21.3%)
	FAST HRH	16 (20 %)	23 (28.8%)
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Source: Appendix IV

Further descriptive results in this study had shown that 26 (32%) of the males and 23 (28.8%) of the females were within the normal bpm of 100bpm. But 16 (20%) of the males and 17 (21%) of the females were of fast RHR (called tachycardia).

Research Question 2: What is the gender difference in the mean of fitness component status using the Resting Systolic Blood Pressure (RSBP) and the related health challenges among the staff members of the Faculty of Education?

Gender	Ν	X	SD	Results
Males	42	119 mm. hg.	5.3	The females have more
Females	40	120 mm. hg.	6.5	RSBP than their males

Table 3: Descriptive Statistical Analysis of Gender difference in Means of RSBP.

Source : Appendix IV

Results: In Table 3, the females have more RSBP value of 120 mm.hg than the males who have 119 mm. hg. . The result is that the males on the average have lower RSBP value than their female counterparts.

Table 4:Descriptive Analysis of Fitness Status by Resting Systolic Blood Pressure and
Health Challenges

FITNESS STATUS	MALES: $N = 42$	FEMALES: $N = 40$	
BY RSBP			
Details			
NORMAL RSBP	30 (36.6%)	19 (23.8 %)	
ELEVATED RSBP	6 (7.3%)	13 (15.9 %)	
HYPERTENSION	6 (7.3%)	8 (10%)	

Source : Appendix IV

Further descriptive analysis in percentages showed that 30 (37.5%) males and 19 (23.8%) females were in the normal RSBP status; 6 (7.5%) males and 13 (16.3%) females were in the elevated RSBP that was between 101 and 129 mm.hg. It further revealed again that 6 (7.5%) males and 8 (10%) females were in the hypertensive stage of resting systolic blood pressure.

Hypothesis Testing

Hypothesis 1: There is no significant gender difference in the fitness component status using the means of Resting Heart Rate (RHR) and the related health challenges among the staff members of the Faculty of Education.

Table 5: Summary of Z-test statistical analysis of no significant gender difference in Fitness component status by RHR.

Gender	N	$\overline{\mathbf{X}}$	SD	Df	SE	Z-cal	Decision
Males	42	79.3 bpm	18.2	80	1.7	12.8	H _o
Females	40	101 bpm	9.2				Rejected

*Significant at $P \le .05$, df. 80 = 2.000 Z-critical value.

Source: Appendix IV

Result: In Table 5, the Z-calculated value of 12.8 is greater than the Z-critical value of 2.000. Therefore the hypothesis that there is no significant gender difference in the fitness component status using means of RHR among the staff members of Education Faculty is rejected. The finding is that there is a significant gender difference in the fitness component status using the RHR values among the Education Faculty staff members. On the average, the males were fitter in fitness component status by RHR than their female counterpart; as the females have significantly faster RHR values than their male counterparts.

Hypothesis 6: There is no significant gender difference in the fitness component status using the means of Resting Systolic Blood Pressure (RSBP) and the related health challenges among the staff members of the Faculty of Education.

Table 6:Summary of Z-test statistical analysis of no significant gender difference in fitness
component status by RSBP.

Gender	N	X	SD	Df	SE	Z-cal	Decision
Males	42	119 mm. hg.	5.3	80	1.33	0.83	H _o Upheld
Females	40	120 mm. hg.	6.5				

*Significant at $P \le .05$, df. 80 = 2.000 Z-critical value.

Source: Appendix IV

Result: In Table 6, the Z-calculated value of 0.83 is less than the Z-critical value of 2.000. Therefore, the hypothesis that there is no significant gender difference in the fitness component status using the means of RSBP among the staff members of Education Faculty is upheld. The finding is that there is no significant gender difference in the fitness component status using the means of RSBP among the Education Faculty staff members. On the average, the males were not fitter in fitness component status by the RSBP values than their female counterparts.

DISCUSSION

The study's findings showed significant gender differences in the fitness component status by using the Resting Heart Rate (RHR). For the adults of this nature, the cardiovascular fitness component was investigated because of its association with healthy living, longevity and productivity in work-places. The males had RHR of 79.3bpm while the females had RHR of 101bpm. Physiologically, males are noted to have slower or lower heart-beats than the females on the average. The adults males' heartbeats is to be between 70 -72 bpm and the females between 78-82 bpm. The difference between the genders is due to the sizes of the heart organ which typically is smaller in females than in males. The smaller size female's heart pumps less blood with each beat, and needs to beat at a faster rate to match the larger male's heart output. The study's findings revealed the same trend but slight higher beats in the 2 genders than the acceptable rating. Medically, the average normal RHR is up 100bpm

and is fast when beyond 100bpm (Subramanian, Sharma and Rajendran, 2018). Again, information to compare heart rates in other University settings are still not available for comparison. Further descriptive results in this study had shown that 26 (32%) of the males and 23 (28.8%) of the females were within the medically accepted normal bpm of 100bpm. But 16 (20%) of the males and 17 (21%) of the females were of fast RHR (called tachycardia). Definitely, there is a related health challenge in this aspect of cardio-vascular fitness component status among the staff members of Education Faculty. Tachycardia is a serious health challenge when it is constant in a person.

Complimentarily, the RSBP values also showed that the findings in the BMI, somatotype status and the RHR could not just be overlooked with doubts. The resting systolic blood pressure reading has been used in the study as often medically advised. The results showed that the mean value of the males was 120 mm.hg. while the females had 119mm.hg. resting systolic reading. There was significant gender difference. But statistics is a number of average. The true picture is on each individual. Medically, the adults' reading from the systolic value allows up to 120 mm.hg. for normal resting blood pressure when it is up to 129 mm.hg, it is an elevated resting systolic blood pressure; 130 to 139mm. hg. is hypertension stage 1; 140 to 179 mm.hg. is stage 2; while 180mm. hg. and above is morbidly or crises stage that needs immediate intervention. Further descriptive results had shown that 30 (37.5%) males and 19 (23.8%) females were in the normal RSBP status. It becomes a cause for serious concern to find that 6 (7.5%) males and 13 (16.3%) females were in the elevated RSBP that was between 101 and 129 mm.hg. It further revealed again that 6 (7.5%) males and 8 (10%) females were in the hypertensive stage of resting systolic blood pressure. In matters of health, it is very individualistic; hence the hypothetical mean may not always give all the empirical facts on health of every individual in the population. For this study, the results should be seen as serious that there are related health challenges on fitness component status by blood pressure among the staff members of the Education Faculty. There is truly poor cardio-vascular fitness component status of members. Faculty members' fitness levels of health are far from being sound. The finding is a common trend in other studies about sedentary adults (Deswal and Bozkurt, 2016; Gillis and Sullivan, 2016). The staff members were already overweight, and obese with many having endomorphous status and tachycardia. According to Agrawal and Agrawal (2016) and WHO (2020), one of the two major explanations for gender difference in health challenges is health behaviours.

CONCLUSION

The study concluded that there is a significant gender difference in the fitness component status using the Resting heart rate (RHR) values among the Education Faculty staff members. On the average, the males were fitter in fitness component status by RHR than their female counterpart; as the females have significantly faster RHR values than their male counterparts. There is no significant gender difference in the fitness component status using the means of Resting systolic blood pressure (RSBP) among the Education Faculty staff members. On the average, the males were not fitter in fitness component status by the RSBP values than their female counterparts.

RECOMMENDATIONS

- The staff should be enlightened to check their BMI, heart rate and blood pressure measurements from time to time to ensure that they subject themselves to ideal weight class to avoid the related health challenges.
- By these findings, the staff members should avail themselves of medical check-ups to ascertain their health statuses.

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