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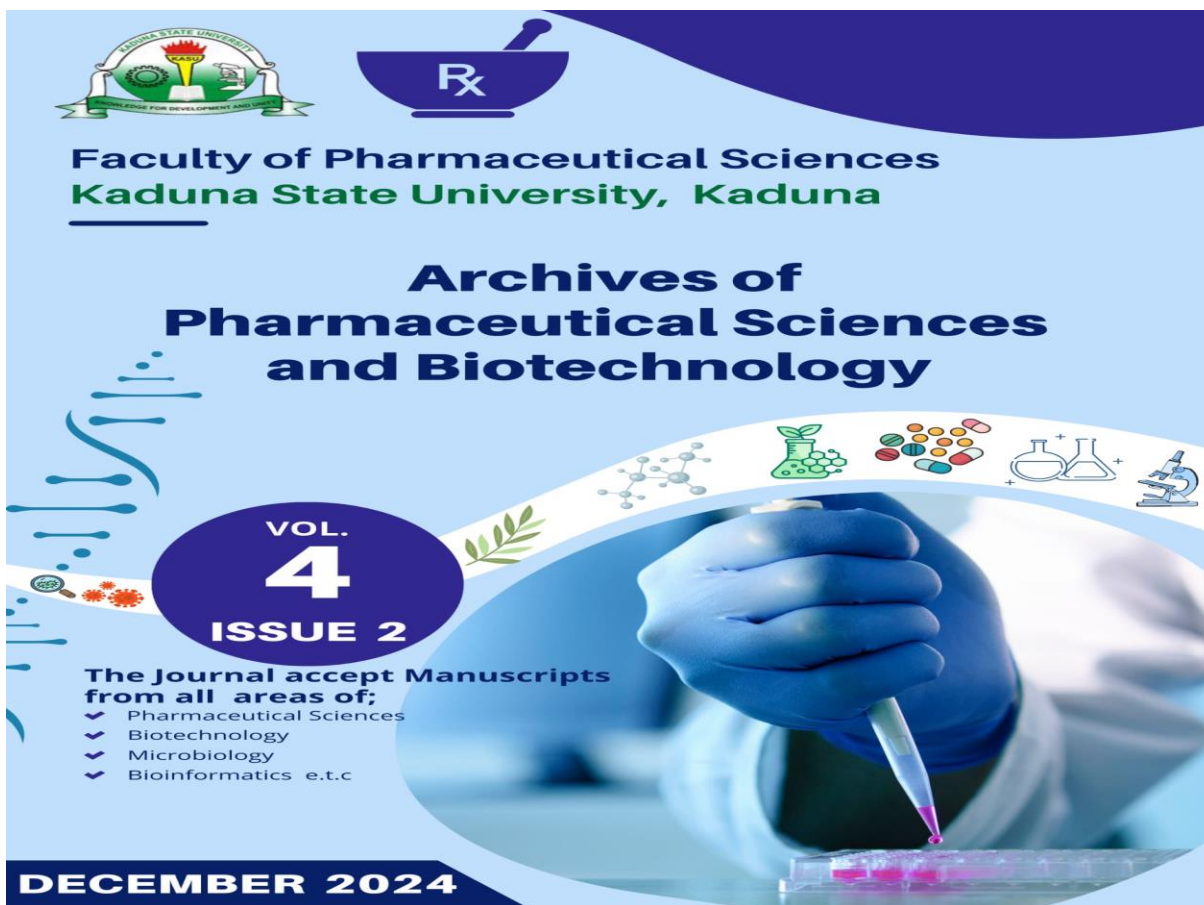
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## RELATIONSHIP BETWEEN BLOOD PRESSURE AND BODY MASS INDEX AMONG MARRIED AND UNMARRIED FEMALE STUDENTS IN A TERTIARY INSTITUTION IN KADUNA STATE

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### ABSTRACT

**Introduction:** Cardiovascular risk factors have been reported in settings of stress, lack of social support, altered patterns of feeding, poor socioeconomic factors and poor night sleep duration at differing levels of marital status. Hypertension is an important risk factor for cardiovascular disease (CVD) in women. There are specific risk factors in women which may contribute to CVD risk.

This study was carried out at the department of Human Physiology, Ahmadu University Zaria.

**Aim:** The study was aimed at analyzing the relationship between blood pressure and BMI among married and unmarried females.

**Method:** This study involved 200 female subjects selected by Simple Random Sampling Technique, 100 unmarried and 100 married, within the age range of 15-65 years. Their blood pressure, height and weight were measured and Body Mass Index determined (BMI). Data collected was expressed as mean  $\pm$  SEM and analysed using independent *t*-test.

**Results:** In this study, the mean systolic blood pressure in unmarried women was found to be  $118.09 \pm 1.56$  mmHg while in married women was  $120.30 \pm 1.15$  mmHg. The mean diastolic blood pressure in married respondents was significantly higher at  $79.31 \pm 0.83$  mmHg than in unmarried individuals which was  $76.40 \pm 0.88$  mmHg. Also, the mean (BMI) of unmarried women was  $57.97 \pm 1.05$  kg/m<sup>2</sup> and in married women,  $69.37 \pm 1.29$  kg/m<sup>2</sup> with a higher prevalence of both overweight and obesity observed among married women compared to their unmarried counterparts.

### Conclusion

This study concluded that unmarried women had lower blood pressure and less likelihood of being overweight.

**Key words:** Cardiovascular, married, unmarried, blood pressure, body mass index

### INTRODUCTION

Marital status usually changes as life progresses, for an individual marital status is expected to change from single to married or

for some to divorced status. Studies have shown that the relationship encountered in any given marital status may impact positively or negatively on lifestyle and



health of the subject [1]. Some studies have also revealed that marital status confers some measure of protection and satisfaction that contribute to increased quality of life and good health. On the contrary, living alone in a non-marriage state, whether as single, separated, divorced or widowed persons, reduces quality of life and maybe associated with cardiovascular morbidity and mortality [2].

Cardiovascular risk factors have been reported in settings of stress, lack of social support, altered patterns of feeding, poor socioeconomic factors and poor night sleep duration at differing levels of marital status [3].

The marital relationship is typically identified as the most important relationship for promoting health because being married enriches one's social environment in ways that promote better health [4].

Body mass index (BMI) is the simplest acceptable tool for determining relative body fatness in both clinical and epidemiological studies and was recommended as a universal criterion of overweight and obesity [5, 6]. It has been reported that a BMI above 27.8 and 27.3 kg/m<sup>2</sup> for men and women, respectively, may increase morbidity and mortality [7]. Overweight and obesity represent a rapidly growing threat to the healthy populations in an increasing number of countries. In Nigeria, the average life expectancy for women is approximately 55 years [8] and is becoming a global epidemic [9] and may account for as many as 15-30% of deaths from Coronary Heart Disease (CHD), hypertension and 65-75% of new cases of type 2 Diabetes Mellitus [10].

Hypertension is a major risk factor for cardiovascular disease (CVD) and outcomes

in women [11]. In relation to this, significant advancement has been made in the awareness, treatment, and prevention of CVD in women over the last 10 years. Unfortunately, hypertension is often underestimated and undiagnosed [12,13]. There is an abundance of literature concerning relationship between blood pressure and body mass index. However there still exists a paucity of data on African women, especially married women that this study aims to elucidate.

### **Marital status and the risk of cardiovascular disease**

Marriage is often recognized as the main factor in a relationship for enhancing health, probably because being married improves a person's social environment in a manner that promotes better health [4]. Recent research however, suggests that the benefits of marriage for health may have been overstated and that the married appear to be in better health than the unmarried largely because of the adverse effects of marital dissolution on health [14]. Overweight and obesity contribute to type 2 diabetes, cardiovascular disease, some cancers [15, 16], and increased mortality [17].

Sociologists have long argued that marital status is a defining feature of the social environment [18], and several studies point to the potential importance of marital status in affecting adults' body weight. Past research suggests that marriage is associated with weight gain [19] while divorce and widowhood [4] are associated with weight loss, but results are inconsistent and limited in important ways. Another constraint is that sociodemographic differences in the estimated effects of marital status and



transitions on body weight are not often investigated. A few studies consider gender differences in the impact of marital status on weight [4], but researchers have not addressed the possibility of race or age differences. This is important because both body weight and the prevalence and experience of different marital statuses vary significantly by race, age, and gender. Besides, susceptibility to weight gain and loss may vary across groups. Thirdly, previous research has not directly tested possible mechanisms through which weight gain or loss might occur.

## MATERIALS AND METHODS

### Research design

Experimental Grouping and Study Location: This study involved 200 female subjects, 100 unmarried and 100 married, within the age range of 15-65 years. All subjects were selected from different departments on the Samaru Campus of Ahmadu Bello University Zaria, Kaduna State. The study was aimed at analyzing the relationship between blood pressure and BMI among married and unmarried females.

### Sampling technique

In this study, simple random sampling technique was used and questionnaires were distributed to subjects where personal information of each subject was recorded.

### Inclusion and exclusion criteria

#### Inclusion Criteria

Female subjects who were healthy and willing to participate and were 15 years and above.

### Exclusion Criteria

Pregnancy and any gross physical abnormality were the only exclusion criteria against the physical measurements.

### Informed Consent

Informed consent was obtained from all the participants before conduct of the study. Ethical standards and best practice such as respect for Persons and their Human Rights, beneficence and Justice were adhered to throughout the conduct of the study.

### Research instruments used

Stethoscope, Automatic blood pressure apparatus and mercury sphygmomanometer, weighing scale, measuring tape.

### Procedure

#### Blood pressure

The blood pressure of subjects was measured using a mercury sphygmomanometer where each subject was seated for 5 mins before the start of the measurement. The subject's arm was flexed and the cuff wrapped around the upper arm of the subject firmly and the stethoscope bell was placed at the region of the antecubital fossa over the brachial artery to listen to the blood pulsing through the arteries, the sphygmomanometer was then inflated to about 180 – 200 mmHg and it was slightly released. The first knocking sound heard using the stethoscope was noted as the systolic blood pressure and where the sound disappears was noted as the diastolic blood pressure. Also, blood pressure was measured using a digital automatic apparatus (Omron M2). The readings were taken in a sitting position after the subjects rested for at least 5 mins. Three measurements were taken with intervals of 3 mins between consecutive



measurements. To ensure that the resting blood pressure was captured, the measurement was taken after the participant must have sat quietly for 10 mins without any activity [20].

### Determination of Weight

Weight was measured with a bathroom weighing scale. Subjects were asked to stand on the weighing scale barefooted, upright and in a relaxed position then the reading on the scale was recorded.

### Determination of Height

Using a measuring tape, the subject was asked to stand barefoot and upright. The tape was then placed from the head to foot and the height was recorded in cm.

### Determination of Body Mass Index (BMI)

Weight and height were measured with subjects standing without shoes and wearing light clothing. Subjects stood upright with the head in Frankfurt plane for height measurement.

BMI was calculated as weight in kilograms over height in metres squared [weight (kg)/height (m)<sup>2</sup>]. The BMI was classified based on World Health Organization criteria, [6] as underweight if < 18kg/m, normal weight if 18.5-24.9 kg/m, overweight if 25-29.9 and obese if ≥ 30 kg/m.

### RESULTS

Data collected was expressed as mean ±SEM. It was analysed using independent *t*-test to compare the level of significance between the control and experimental groups, using the Statistical Package for the Social Sciences (SPSS) version 23.0.

**Table 1: Systolic and Diastolic Blood Pressure among Married and Unmarried Women**

Group	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Un-Married	118.09 ± 1.56 <sup>a</sup>	76.40 ± 0.88 <sup>a</sup>
Married	120.30 ± 1.15 <sup>a</sup>	79.31 ± 0.83 <sup>b</sup>

Values with different superscripts are statistically significant at  $P = 0.05$ ,  $t(\text{SBP}) = -1.351$ ,  $F(\text{SBP}) = 0.040$ ,  $P(\text{SBP}) = 0.178$ ,  $df = 198$ ,  $t(\text{DBP}) = -2.397$ ,  $F(\text{DBP}) = 1.305$ ,  $P(\text{DBP}) = 0.017$ ,  $df = 198$ ,



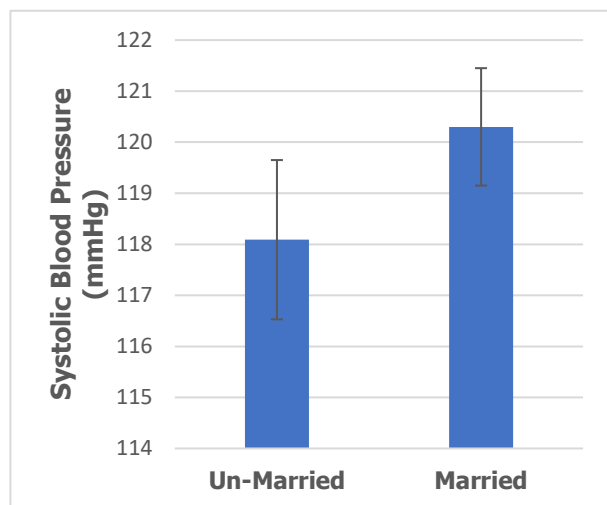


Figure 1: Graph of Systolic Blood Pressure among Married and Unmarried Women

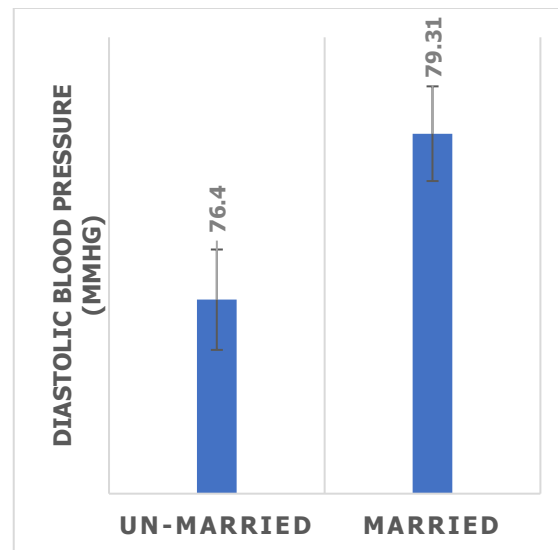


Figure 2: Graph of Systolic Blood Pressure among Married and Unmarried Women

Table 2: Body Mass Index of Married and Unmarried Women

Un-Married	57.97 ± 1.05 <sup>a</sup>	1.61 ± 0.01 <sup>a</sup>	22.36 ± 0.47 <sup>a</sup>
Married	69.37 ± 1.29 <sup>b</sup>	1.60 ± 0.01 <sup>a</sup>	27.21 ± 0.47 <sup>b</sup>

Values with different superscripts are statistically significant at  $P = 0.05$   $t(W) = -6.845$ ,  $F(W) = 5.649$ ,  $P(H) = 0.000$ ,  $df = 198$ ,  $t(H) = 1.951$ ,  $F(H) = 0.023$ ,  $P(H) = 0.051$ ,  $df = 198$ ,  $t(BMI) = -7.279$ ,  $F(BMI) = 0.203$ ,  $P(BMI) = 0.000$ ,  $df = 198$ ,

## DISCUSSION

There have been several studies conducted in Nigeria that have investigated the relationship between marital status and blood pressure. One such study by Akpa *et al.* [21] found that married individuals had higher systolic and diastolic blood pressure compared to unmarried individuals. In contrast, a study by Okeahialam *et al.* [22] reported no significant difference in blood pressure between married and unmarried individuals.

In this study, there was no significant difference between the systolic blood pressure of the unmarried ( $119.09 \pm 1.56$ ) and

the married subjects ( $120.30 \pm 1.15$ ) but, there was significant difference between the diastolic blood pressure of the unmarried ( $76.40 \pm 0.88$ ) and that of the married subjects ( $76.31 \pm 0.83$ ) (Table 1, Figure 2). In line with previous research such as that of Ofili *et al.*, [23], this study also revealed that hypertension prevalence was significantly higher in married respondents than in unmarried individuals. The issue of family and, family burden, in relation to blood pressure cannot be over-emphasized. This may be attributed to increased responsibilities or social stresses faced by married participants [24] and associated

changes in the married subjects as a result of the interplay of hormones during periods of pregnancy [25].

In this study, there was a significant difference observed between the BMI of unmarried ( $22.36 \pm 0.47$ ) and the married subjects ( $27.21 \pm 0.47$ ) (Table 2, Figure 2). The BMI of the married is higher than the unmarried. This is in consonance with previous studies in Eastern Nigeria [26] and China [1], which concluded that marriage contributes to an increased risk in overweight and obesity. Obesity is a risk factor of hypertension. It is also associated with dyslipidemia and atherosclerotic vascular changes that might enhance vascular resistance, and enhance cardiovascular compliance and the generation of hypertension. Studies have also shown that obesity can cause a rise in mineralocorticoid receptors and circulating aldosterone, thereby increasing plasma volume, causing platelet aggregation and endothelial dysfunction [27]. Furthermore, a study conducted by Nura *et al.* indicates that marital status was another predictor of overweight and obesity [28]. Married respondents have 3 times odds to be overweight or obese than unmarried as comparable with a study carried out on Mexican American and Central American women, which revealed being single was associated with less likelihood for developing obesity than married respondents. [29] This agrees with this research. In addition, a research conducted among Chinese adults shows 1.4 times odds of obesity among the married than those out of marriage [1]. In marriage, especially at onset, there is a tendency for food to be available most of the time. In our setting, couples tend to eat a lot in the guise of family harmony and love. This

might explain this high prevalence of both overweight and obesity among married people.

Overall, the relationship between marital status and blood pressure in Nigeria appears to be complex and may be influenced by various factors such as social support, pregnancy, and hormonal changes. Further research is needed to fully understand these relationships.

## CONCLUSION

This study shows that unmarried women had lower blood pressure than married women and have less likelihood of being overweight.

## ACKNOWLEDGMENTS

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