Spousal Similarities and Differences in Physical and Cultural Traits among the Igbo Ethnic group in Nigeria

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Abstract

This study investigated spousal differences and similarity in physical selected socio-cultural traits. Forty two couples of the Ibo ethnic group of Nigeria participated in the study. Anthropometric measurement taken: weight, height, skinfold thickness, waist, hip, mid thigh, arm and forearm circumference and blood pressure (BP). Socio-cultural traits investigated were level of education, exercise and method of spousal selection. Male spouses were significantly taller (P<0.001) and had significantly higher values for systolic and diastolic (BPs), and arm circumference (P<0.01, P<0.05, P<0.001), hip and waist circumferences were higher in females (P<0.05, P<0.001). Marriages 15 years males were taller (P<0.001) had higher BP and forearm circumference (P<0.05) while females showed higher values for skinfold thickness. Marriages 16 years, females have significant waist and hip circumference and skinfold thickness (P<0.05, P<0.001). Only mate selection (r =0.69, P< 0.001) support the hypothesis that westernization is expected to increase spousal concordance due to the decreasing incidence of arranged marriages.

INTRODUCTION

Assortative mating, a correlation between partners in some physical and social characters, is the dominant mating pattern worldwide ([1]). Positive assortative mating occurs when individuals who resemble one another mate frequently than is expected by chance. There are evidence suggesting that the level of spousal concordance for physical traits increases with the adoption of modern life styles ([2]). It has been hypothesized that the shorter the marriage duration, the more close spouses will be in physical traits (statures, fat distribution, systolic and diastolic blood pressure) and cultural traits (education and occupation etc). Further, westernization is expected to increase spousal concordance due to decreasing incidences of arranged marriages overtime and increased individual choice of marriage partners ([3,4]).

To understand the consequences of assortative mating, it is critical to identify the process which generate. The spousal phenotypic, phenotypic assortment is the selection of a spouse based on visible characteristic is most important, because this type of assortment can strongly affect spousal genetic correlation ([5]). Phenotypic assortment has strong effects in the population, as the spousal genetic correlation increases the phenotypic variation in the next generation ([6]). For example, it is possible that assortative mating by BMI could be contributing to the increasing prevalence of obesity found in the western countries ([7]). When studying body weight and body height, the assumption that assortative mating due to phenotypic assortment is plausible, as tall women would prefer to marry tall men ([5]). However, it is also possible that the spousal phenotypic correlation is due to similarities in the background environments of spouses i.e. social homogamy. For instance, assortative mating by education is well documented ([8, 9]), and education has been noted to correlate with body height ([10]). In addition, spousal correlations may arise from shared spousal environments, when spouse form a new family unit and live in the same household. In this case spousal correlation would be related to the duration of the marriage cohabitation. Beresford (1976) found that the correlation of blood pressure among spouses varied with length of marriage.

This study examined concordance for selected physical (biological) and cultural traits among spouses married ≤15 years (marriage dates 1989 – 2004) and ≥ 16 years (1988 and before). Differences in, stature, BMI, subcutaneous fatness and blood, blood pressure between couples and according to length of marriage would also be established, since such date are lacking in Nigeria, and thus comparing the findings with the stated hypothesis.

MATERIALS AND METHODS

STUDY DESIGN

This research was based on a random sampling of 42 couples (84 people), volunteered to participated in the study after giving informed consent. The study involved an assessment of weight, height, waist circumference, hip circumference, mid arm circumference, mid fore arm circumference, mid thigh circumference, subscpular skin fold, triceps skin fold, calf skin fold, sum of 3 skin folds and blood pressure of the subject. Anthropometric measurements taken at the participants homes using standard protocols (Lohman et al., 1988). Socio-cultural questions were asked on date of marriage, level of education, physical activity, and method of spousal selection. Based on the marriage duration (length of marriage). The 42 couples were divided into two groups: married ≤ 15 years and married ≥ 16 years.

ANTHROPOMETRY

Height was measured to the nearest 0.1 centimeters using Harpeden anthropometer (Holtain Ltd Crosswell UK) with the participants standing without shoes and with heels together, toes apart. Weight was measured with a balance scale (Hanson Ltd UK) to the nearest 0.1kg with subjects wearing light cloths. An inelastic tape (Butterfly Brand Shanghais, China) was used to measure hip, circumference, the tape was place around the buttocks at the level of maximum protrusion. Waist circumference (WC) was measured at the level of the natural waist, which is the narrowest part of torso below the rib cage and above the hips. Thigh, arm and fore arm circumferences (TC, AC, FC) were taken at the mid point of the thigh, arm and fore arm respectively.

Skin fold thickness was measured on the subject's body at 3 sites (triceps, subscapula and calf) by using Harpenden skin fold caliper (Holtain Ltd. Carymmych UK) to the nearest 0.01 millimeters. The triceps skin fold (TS) was measured in the mid line of the posterior aspect of the arm over the triceps muscle midway between the lateral process of the scapula and the inferior margin of the ulna olecranon process. The subscapular skin fold (SSF) was taken beneath the inferior angle of the scapular. In these cases, a double thickness of skin and underlying tissue were raised and measured. The body mass index (BMI) was calculated as weight kg divided by height (kg/m^2).

BLOOD PRESSURE (BP)

BP measurements were carried out using aneroid sphygmomanometer (Aneroid Super Atlas) and Littman stethoscope to the nearest 0.1mmHg. Seated BP was measured with the cuff on the right arm of the subject. The stethoscope was used to established systole as the initiation of Korotkov sound (phase 1) and diastole as the cessation of Korotkov sound (phase 5). The blood pressure was measured three times with the cuff completely evacuated and recovery allowed between readings. The average of the three was used as the dependent variables, systolic and diastolic blood pressure.

STATISTICAL ANALYSIS

The data were expressed as mean ± standard deviation (SD). Significant difference of all the variables (age, height, weight, skin folds body circumferences, BMI and Blood Pressure) were established using Student's t–test. Pearson correlation co-efficient was used to estimate concordance for physical and cultural traits between couples. $P < 0.05$ was considered statistically significant. SigmaStat 2.0 for windows (Systat Inc., Point Richmond, CA) was used for statistical analysis.

RESULTS

Table 1 shows the anthropometric characteristics and blood pressure of couples by sex. There was no significant difference in BMI and us well as in the weight of the couples, but significant difference did exist for stature, systolic BP, diastolic BP, HC, WC and FC with the males having higher values for WC and HC were evident for the females. The female partner despite significant skinfold thicknesses (TSE, CSF, and 3SF) $P < 0.001$ respectively. This was indicative of excess peripheral adiposity.

Table 2 present the means and standard deviation of physical traits for spouses married ≤ 15 years ≥ 16 years. in marriages less than or equal to 15 years or greater than 16 years, the BMI of the females were slight higher than that of the males but not statistically significant. The blood pressures of the males were significantly higher than that of the females is both marriages (≤ 15 years, ≥ 16 years) except for the systolic BP of those married greater than 16 years. Further, for marriages ≤ 15 years, body circumferences did not indicate any significant difference between the sex except for FC ($P<0.05$), which for marriages &$8805; 16 years, females showed significant WC and HC ($P<0.01$) respectively.

This may imply that WC and HC increase with increase length of marriage in the females. Both marriages have

comparable values for AC and TC in both sexes. In addition, females showed significant skinfold thickness for TSF, CSF and SSF (P<0.001) respectively, in marriages (≤ 15 years and for TSF, CSF and SSF (P<0.001, P<0.001, P<0.05) respectively in those married ≥ 16 years.

Figure 1

Table 1: Mean and Standard deviation of physical traits for spouse

Parameters	Males	Females
Stature	169.04±7.36***	161.81±6.70
Weight	76.52±13.39	73.83±14.00
Body Mass Index	26.57±4.31	28.14±4.73
Systolic Blood Pressure	126.71±23.59*	114.92±18.64
Diastolic Blood Pressure	87.59±13.20***	78.06±11.36
Waist Circumference	88.69±7.87	94.89±10.38**
Hip Circumference	98.29±8.34	103.33±9.63*
Arm Circumference	30.10±3.23	30.39±3.77
Forearm Circumference	25.17±2.96*	23.62±2.48
Thigh Circumference	52.02±5.28	51.89±6.30
Subscapular Skinfold	17.67±11.78	22.17±10.31
Triceps Skinfold	7.83±3.41	20.36±7.68
Calf Skinfold	11.53±5.67	21.61±7.77
Sum of 3 Skinfolds	37.02±15.90	64.13±21.58

*P<0.05, **P<0.01, ***P<0.001

Spousal concordance (n = 42).

Figure 2

Table 2: Mean and Standard deviation of physical traits for spouse Spousal concordance for marriages ≤ 15 yrs and marriages ≥ 16yrs

	Marriages ≤ 15 yrs n = 28		Marriages ≥ 16yrs n = 14	
Parameters	Males	Females	Males	Females
Stature	170.17±6.06***	161.35±6.66	166.77±9.28	162.75±6.98
Weight	77.54±12.49	72.07±15.67	74.50±15.32	77.38 ± 9.39
BMI	26.70±3.55	27.60±5.29	26.87±5.69	29.22±3.25
Systolic BP	126.90±25.39*	114.65±19.57	126.33±20.39	115.45±17.33
Diastolic BP	87.98±13.38*	79.23±11.68	86.76±13.29*	75.71±10.72
Waist Circumference	88.59±7.89	92.09±9.63	88.18±11.36	100.50±9.8**
Hip Circumference	98.90±8.07	101.82±10.62	97.07±9.0	106.36±6.6*
Arm Circumference	31.05±3.23	29.52±3.86	30.89±3.34	32.14±2.98
Forearm Circumference	25.43±2.95*	23.61±2.77	24.66±3.03	23.65±1.84
Thigh Circumference	52.92±6.48	51.00±6.48	50.21±5.0	53.67±5.7
Subscapular Skinfold	15.40±7.49	21.90±11.89*	22.19±16.98	22.71±6.39
Triceps Skinfold	8.12±3.53	19.76±8.22***	7.24±3.18	21.54±6.58***
Calf Skinfold	11.94±5.86	21.47±8.38***	10.71±5.39	21.84±6.68***
Sum of 3 Skinfolds	35.47±15.05	63.15±24.90***	40.13 ± 17.62	66.10±13.20***

*P<0.05, **P<0.01

Table 3 presents spousal concordance for physical traits by marriage length while Table 4 shows the concordance for socio-cultural traits by marriage length. Spousal correlation for physical traits are generally lowest and non-significant among those married longest (marriages ≥ 16 years) while among those married ≤ 15 years, concordance only waist circumference, systolic BP and subscapular skin fold (r = 0.40, r = 0.38 and r = 0.42) respectively, (P<0.05). Spousal concordance for mate selection increases with decrease length marriages and was significant for those married ≤ 15 years (P<0.001, r = 0.63), while concordance for exercise decreases with increase length of marriage but not significant. Spousal correlation for education is non-significant.

Figure 3

Table 3: Table Spousal correlation for physical fruits by marriage duration

Physical Traits	n = 42	Marriages ≤ 15 yrs n = 28	Marriages ≥ 16yrs n = 14
Stature	-0.19	-0.003	-0.41
Weight	0.10	0.14	0.10
Body Mass Index	0.04	0.15	-0.18
Waist Circumference	0.27	0.40*	0.20
Hip Circumference	0.27	0.31	0.33
Arm Circumference	-0.11	-0.13	-0.04
Forearm Circumference	0.07	0.05	0.15
Thigh Circumference	0.10	0.19	0.10
Systolic BP	0.23	0.38*	-0.22
Diastolic BP	0.21	0.22	0.18
Subscapular skin fold	0.13	0.42*	-0.30
Triceps skin fold	0.01	0.02	0.05
Calf skin fold	0.20	0.16	0.33
Sum of 3 skin folds	0.12	0.20	-0.12

*P<0.05

Figure 4

Table 4: Concordance for socio-cultural traits by marriage length cont.

Socio-cultural Traits	n=42	Marriages≤15 yrs n = 28	Marriages≥16yrs n = 14
Education	0.29	0.25	0.38
Exercise	0.22	0.34	0.00
Spousal selection	0.54	0.69***	0.41

***P<0.001

DISCUSSION

An important finding of the present study is that in shorter marriage duration (≤ 15 years) spouses will be more concordance for physical and cultural traits than in longer

marriage duration (≥ 16 years) showed that waist circumference, systolic BP and subscapular skin fold thickener's support the hypothesis while others are not congruent with the hypothesis. Of the socio-cultural traits examined, only the result on the method of spousal/mate selection supports the hypothesis ($r = 0.69$, $P<0.001$). This is expected in recent times among the Ibos because parental influences in the choice of a partner for couples is drastically reduced unlike in the old days (≥ 16 years). One interpretation of concordance in blood pressure is that when spouses share a similar environment with same diet, socio-economic status and level of physiological stress over a long period, they tend to have similar BP level ([4]).

In support of the present finding is the report by Inoue et al ([13]) that spousal concordance for obesity and blood pressure in mountain village of Japan is significant for those married 15 years or less and 31 years and more among couples married 15 years or less, blood pressure correlation between spouses may reflect the influence of assortative mating more than those married for longer period or shared environment ([14]). Also blood pressure was higher for couples married 15 years or less, suggesting that acculturation may have been important.

Another possibility is that mate selection based on social characteristics such as educational level may be restricting the populations aggregating BP phenotype similar to the phenomenon noted for stature ([3]) while Pomerate ([15]) reporting data from Boston showed that the highest degree of homogamy other than for age was the correlation for stature.

Although many populations tend to assortatively mate, however, some do not for instance James et al ([3]) noted significant spousal correlation among more “Western oriental”, but not among more “traditional living”, Samoan couples for stature, systolic and diastolic BP and level of education. The most significant correlations for stature and systolic and diastolic BP was evident for Samoan couples married 15 years or less which was attributed to the influence of acculturation ([3]).

Studies ([4], [16]) considered similarities (concordance) in physical traits between couples, this study also tries to look at differences in physical traits between couples and according to length of marriage. This among 42 spouses married ≤ 15 years and ≥ 16 years, significant skinfolds (TSF, CSF, 3SF), waist circumference, and hip circumference were evident for the females. Also females BMI (28.14 ± 18.64) was greater than that of the male counterpart although not significant differences in physical traits between the spouses (males and females) may be due to sex and parity. On the other hand, the males show significant BP, FC and stature, and all indicate biological differences in body shape composition between females and males.

Further analysis of the data according to sex and marriage duration indicated that in marriages ≤ 15 years males were taller and had significant BP and FC while the females showed significantly greater mean value of skin folds (TSF, SSF, CSF and 3SF). In addition marriages ≥ 16 years the males indicated significant diastolic BP ($P<0.05$) while females indicated significantly high WC, HC and skinfold thicknesses. With the foregoing, this study is tempted to speculate that increase in marriage duration (≥ 16 years) favors significant increase in WC and HC possibly because most women within this length of marriage may have entered menopause resulting to excess deposition of fat along the trunk and hip.

Further, significant skin fold thickness is a characteristic of the female other than the males despite the duration of marriage. While the selection of spouses based on deranged marriage brings about the aggregation of some phenotype resulting in spousal similarity for body composition (WC, SSF and systolic BP, most especially among Ibos married 15 years or less.

Further research is needed to evaluate spousal concordance for these traits in larger sample among the Ibos and other ethnic groups in Nigeria to study the effect of marriage on the physical and sociocultural traits. The present findings of should form the basis of future research.

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