A PRELIMINARY ANTHROPOMETRIC ASSOCIATION BETWEEN HIP CIRCUMFERENCE AND CHEST CIRCUMFERENCE

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INTRODUCTION

- **Anthropometric indices**
  (Suchitra *et al.*, 2015).

- **Variation in body size**
  (Pungle *et al.*, 2015).

- **The chest and hip**
  (Bryne *et al.*, 2010; Kilani *et al.*, 2010).

PRESENT STUDY

- **Importance of chest and hip circumference measurements**

(Parker *et al.*, 2009).

- **Few published studies in Ghana.**

- **The need to generate population specific models.**

AIM

To determine the correlation between chest circumference and hip circumference.

SPECIFIC OBJECTIVES

- **To determine chest and hip measurements of the participants.**
- **To determine the correlation between chest circumference and hip circumference.**
- **To determine the relationship between chest and hip circumference in relation to sex and tribe.**

SPECIFIC OBJECTIVES

- **To derive a model for predicting hip circumference using chest circumference.**

- **To derive models for predicting sex and tribe using hip and chest circumferences.**

MATERIALS AND METHODS

- **STUDY DESIGN AND LOCATION**

➢ **Location**: Anatomy Department- School of Medicine and Dentistry, KNUST.

➢**Sample size**: 263 (152 males and 111 females; age range: 17-25 years).

➢**Duration**: September, 2018 to April, 2019.

➢**Informed participants' consent and Ethics Committee Approval.**

➢**Inclusion and Exclusion criteria.**

✓No bone deformities.

✓Healthy individuals.

MATERIALS AND METHODS

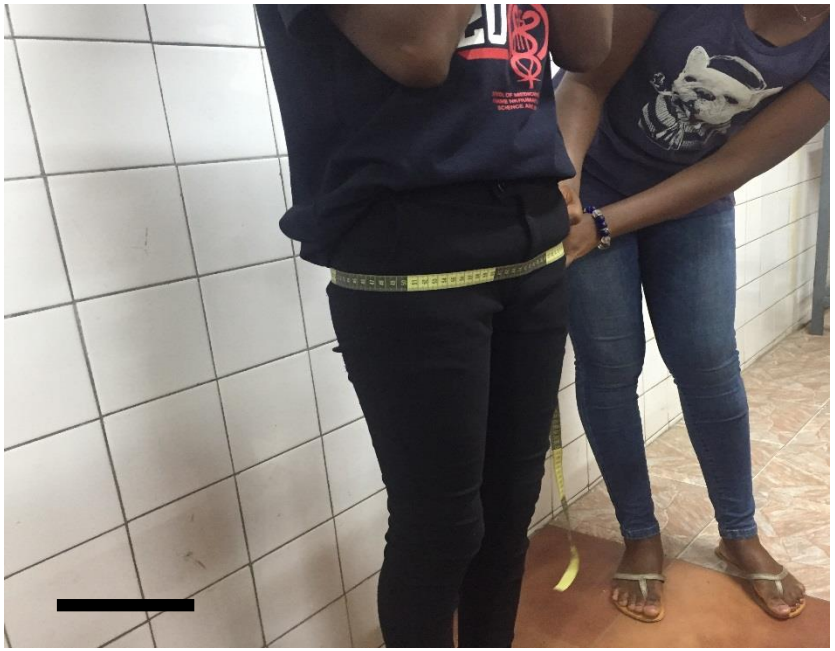
- **Measurements**
  - Hip and Chest circumferences.

- **Measuring instrument**
  - Measuring tape (Shangai, China).

- **Data analysis**
  - SPSS version 20.0.

MATERIALS AND METHODS.

a



b

FIGURE 1: Photographs showing the measurements of (a) chest circumference and (b) hip circumference (Bar representing ×0.3)

RESULTS AND DISCUSSION

Table 1: Descriptive statistics of chest circumference stratified by sex

SEX	N	MEAN± SD (cm)	MINIMUM (cm)	MAXIMUM (cm)	P-value
MALES	152	87.86 ± 6.58	73.50	112.45	
FEMALES	111	87.69 ± 7.63	74.50	118.05	0.850
TOTAL	263	87.79 ± 7.03	73.50	118.05	

*N = Number of participants, **SD** = standard deviation.*

(Not in agreement with Feng *et al.*, 2012)

RESULTS AND DISCUSSION

Table 2: Descriptive statistics of hip circumference stratified by sex

SEX	N	MEAN ± SD (cm)	MINIMUM (cm)	MAXIMUM (cm)	P-value
MALE	152	97.18 ± 8.05	82.10	130.50	
FEMALE	111	98.77 ± 8.76	82.55	121.85	0.130
TOTAL	263	97.85 ± 8.38	82.10	130.50	

***SD** = standard deviation, **N**=number of participants*

(Consistent with Snijder *et al.*, 2004)

RESULTS AND DISCUSSION

Table 3: Descriptive statistics of chest circumference measurement among the tribes.

TRIBE	N	MEAN ± SD	MINIMUM (cm)	MAXIMUM (cm)	P-value
AKANS	218	87.60 ± 7.17	73.50	118.05	
EWES	12	90.11 ± 5.88	80.10	100.25	0.674
GA-ADANGMES	7	88.12 ± 4.66	80.65	94.50	
"OTHERS"	26	88.16 ± 6.89	79.15	108.30	

"OTHERS" *= Mamprusi, Sisaala, Dagomba;* ***SD*** *= Standard deviation;* ***N****=number of participants*

RESULTS AND DISCUSSION

Table 4: Descriptive statistics of hip circumference among the tribes.

TRIBE	N	MEAN ± SD (cm)	MINIMUM (cm)	MAXIMUM (cm)	P-value
AKANS	218	97.73 ± 8.22	82.10	121.85	
EWES	12	98.96 ± 7.36	88.75	112.00	0.903
GA-ADANGMES	7	99.64 ± 11.45	82.20	120.75	
"OTHERS"	26	97.84 ± 9.56	83.90	130.50	

***SD** = Standard deviation; **N**=number of participants,*
*"**OTHERS**" = Mamprusi, Sisaala, Dagomba*

RESULTS AND DISCUSSION

Table 5: Correlation between chest and hip circumferences

SEX	N	r	P - value
MALES	152	0.381	< 0.001
FEMALES	111	0.582	< 0.001
TOTAL	263	0.474	< 0.001

N=number of participants, ***r*** *= correlation coefficient*

Among tribes, only the measured chest circumference of Akans correlated significantly (r = 0.510; p < 0.001) with hip circumference.

RESULTS AND DISCUSSION

Table 6 : Simple linear regression equations for estimating hip circumference from chest circumference.

PARTICIPANTS	EQUATION	R^2	Adjusted R^2	SEE	P-value
Pooled sample	0.564 CC + 48.301	0.224	0.222	7.39	< 0.001
Males	0.465 CC + 56.293	0.145	0.139	7.15	< 0.001
Females	0.668 CC + 40.150	0.339	0.333	7.47	< 0.001
Akans	0.585 CC + 46.519	0.260	0.257	7.09	< 0.001
Akan males	0.463 CC + 56.632	0.165	0.158	7.19	< 0.001
Akan females	0.725 CC + 35.095	0.397	0.390	6.80	< 0.001

***HC** = hip circumference, **SEE** = standard error of estimate; **R^2** = coefficient of determination*

RESULTS AND DISCUSSION

Table 7 : Sex determination using Binary logistic regression analysis

	B	S.E.	Wald	p	odds ratio
Hip cir.	0.031	0.017	3.267	0.071	1.032
Chest cir.	-0.021	0.020	1.059	0.303	0.979
Constant	-1.515	1.776	0.727	0.394	0.220

Nagelkerke R^2 = 0.017, ***Cir.*** *= circumference.*

RESULTS AND DISCUSSION

Table 8: Determination of tribe using Multinomial logistic regression analysis

TRIBE [a]		B	S.E	Wald	p	Odds ratio
Ewe	Intercept	-6.714	3.858	3.028	0.082	
	Chest cir.	0.048	0.045	1.130	0.288	1.049
	Hip Cir.	-0.005	0.041	0.013	0.908	0.995
GaAdangme	Intercept	-5.697	5.266	1.170	0.279	
	Chest cir.	-0.005	0.059	0.006	0.937	0.995
	Hip cir.	0.027	0.047	0.325	0.569	1.027
"OTHERS"	Intercept	-2.921	2.914	1.005	0.316	
	Chest cir.	0.013	0.034	0.160	0.689	1.014
	Hip cir.	-0.004	0.029	0.019	0.891	0.996

(***Cir.*** *= circumference, a. The reference is: Akan. Nagelkerke* R^2 *= 0.010,* $P < 0.05$*).*

"OTHERS= *Mamprusi, Sisaala, Dagomba.*

CONCLUSION

- **There was a positive, weak to moderate significant correlation between hip circumference and chest circumference.**

- **Among tribes, only the measured chest circumference of Akans correlated significantly with hip circumference.**

- **Females had wider hip circumference than males and males recorded broader chest circumference than females.**

CONCLUSION

- **There were no differences in the chest and hip circumferences among the tribes.**
- **Chest circumference could not predict hip circumference.**
- **The hip and chest circumferences were not significant predictors of sex and tribe.**

FUTURE WORK

- **Large sample size is required to increase the accuracy of prediction.**
- **Equal distribution of sex should be considered**
- **There should be equal distribution of participant in terms of tribes to increase the accuracy of prediction.**

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THANK YOU