Waist-Hip Ratio of Boys and Girls based on Mother's Occupational Status at SMPN 22 Surabaya

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Abstract   This research is to analyse the waist-hip ratio of boys and girls in early adolescence (10-13-year-old). The *Waist-hip Ratio* can be measured from the size of waist circumference and hip circumference. The measurement also considering the mother's occupational status that can be categorized into two groups: those who are working mothers and housewives. The formulation of the problem in this research is "how are the children's *Waist-hip Ratio* based on the mother's occupational status". The research samples were 13 years old students from 7th grade (12.4-13.3) at SMPN 22 Surabaya with the total of 200 children. It consists of 50 boys and 50 girls from working mothers group as well as 50 boys and 50 girls from housewives group. The measurement was done anthropometrically on waist circumference and hip circumference, which then was used to determine the *waist-hip ratio* within the sample that later would be categorised into small, normal, and large type. The result of this research showed the majority sample of boys and girls both from working mothers and housewives possess the highest percentage in the small type category with 64% boys from working mothers and 74% boys from housewives. For the girls, 92% were from working mothers and 98% from housewives. However, the large type did not appear in the girls' sample. In addition, the highest percentage also appeared on the girls who had not yet experienced menstruation at the age of 13th are 78% from working mother group and 82% from housewives group.

1   INTRODUCTION

In the globalization era, a mother could have various occupation as options, not only to become a housewife but also to choose working outside from home, develop her career and have her own personal income. Mother's occupational status is divided into two, working mother and housewife. However, taking care of the family, particularly the children, still becomes the main priority. Children's growth is a continuous process starting in the womb until adolescents. There are two factors that influence the children's growth, genetics and environmental factor. The supporting environment creates the optimization of the genetic potentials within the children (Soetjiningsih, 1995).

The girls' puberty experience an increase in the length of extremity, an increase in the amount of fat, faster growth in the genital area and biological maturity. One of the factors which influence is the environment. Generally, in early adolescents, the influence of environment factor is greater compared to the genetic factor. The environmental factors consist of physical, biological, and social which support each other (Abdoerrachman et al, 1988).

Waist-hip Ratio is served as the best indicator in classifying children's nutritional status (AUC = 0,91; 95% CI 0,86-0,96) (Vieira et al. 2018). The analysis results of *Waist-hip Ratio are* more sensitive compared to the BMI as the early warning of the health risks (Ashwell & Hsieh 2005). *Waist-hip Ratio* is the measurement of waist circumference and hip circumference that become a simple, easy, and accurate index in screening the obesity for children and early adolescents (Yan, 2007). It is because the measure of waist circumference considered as the point of abdominal obesity (P.F. et al. 2011). Obesity is a disease which often happened to the children in their periods of growth (Onis, 2010).

The purpose analysis of *Waist-hip Ratio* is to observe nutritional status and obesity. The measurement of waist and hip circumference is to observe fat distribution. Children with fat

accumulated in the waist are easier to experience health problems related to the obesity (Kadir, 2015).

Obesity criteria can be grouped based on anthropometric and laboratory. The determination used for anthropometric are Body Mass Index (BMI), Waist Circumference, Waist-Hip Ratio, Brocca index, skinfold calliper, and underwater weight (Kadir, 2015).

Mother's occupational status, i.e. working mothers and housewives, are the subject variables chosen. Mother's responsibility at home to take care of the family will have some influence. According to Anjani (2016), there is a significant difference in boys' growth in the size of the abdominal circumference.

2 MATERIAL AND METHOD

This research was done with cross-sectional method (one-time observation). The character of this research was analytical research done by analyzing the research subject variables. The data was primary data with the sample of students in SMPN 22 Surabaya at the age of 13th. The data resource was came from the researcher anthropometric measurement questionnaire. Anthropometry is a body measurement study observed the dimensions of bone, muscle, and adipose tissue (fat). In Greek "Anthropo" means "human" and "metron" means "measurement" which developed first by a German anatomist, Johan Sigismund Elsholtz in 1654 (Kolar and Salter, 1997) in Artaria, 2008).

The conducted measurement consisted of waist and hip circumference, which have normal value in the ratio of 0.90 (0.91-9.98) (Yan, 2007). To measure Waist-hip ratio (WHR), the waist circumference was measured circularly through the lowest ribs and iliac towards the hip circumference which was measured around the trochanter mayor (Huxley et al, 2010).

Figure 1: Waist-hip Ratio (WHR) Measurement

3 RESULTS

Anthropometric Measurement Data
Boys

Table 1: The Anthropometric Size of Boys from Working Mothers

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Circumference	50	531	981	747.14	129.116
Hip Circumference	50	653	1067	838.94	105.847

Table 2: The Anthropometric Size of Boys from Housewives

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Circumference	50	530	1062	708.00	134.067
Hip Circumference	50	653	1110	831.12	113.673

Table 1 and Table 2 shows that the mean of waist circumference of boys from housewife mother is 678.66 and 679.26 from working mothers. The mean size of boys' hip circumference from working mothers is 819.26 and 843.06 from housewife mothers.
Girls

Table 3: The Anthropometric Size of Girls from Working Mothers

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Circumference	50	547	1004	679.26	88.864
Hip Circumference	50	695	1065	819.26	83.235

Table 4: The Anthropometric Size of Girls from Housewives

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Circumference	50	283	847	678.66	98.222
Hip Circumference	50	659	1018	843.06	87.580

Table 5: Menstruation Status of Girls from Working Mothers

		Frequency	Percent
Valid	Have experienced menstruation	11	22.0
	Have not yet experienced menstruation	39	78.0
	Total	50	100.0

Table 6: Menstruation Status of Girls from Housewives

		Frequency	Percent
Valid	Have experienced menstruation	9	18.0
	Have not yet experienced menstruation	41	82.0
	Total	50	100.0

Table 3 and Table 4 shows the means of the girl's waist circumference size from housewife mothers is 678.66 and 679.26 from working mothers. While the mean size of the girl's hip circumference from housewife mothers is 843.06 and 819.26 from working mothers.

Based on the menstruation status in table 5 and 6, there is a high percentage in the category of girls who have not experience menstruation yet. The girls from working mothers are 78% in this category, while from the housewife mothers are 82%. The girls from working mothers who have already experienced menstruation is greater compared to the girls from a housewife mothers.

Based on the *One-Sample Kolmogorov-Smirnov Test*, the normality test of all variables is normally distributed. The decision making is based on the variable value that was <0.05.

4 DISCUSSION

Table 7: Waist-hip Ratio Value of the Boys

		Boys from Working Mother		Boys from Housewives	
		Frequency	Percentage	Frequency	Percentage
Valid	Small	32	64.0	37	74.0
	Normal	15	30.0	11	22.0
	Large	3	6.0	2	4.0
	Total	50	100.0	50	100.0

Table 9 shows the value of *Waist-hip Ratio* of the boys from working mothers have the highest percentage in small type category which is 64%, while the lowest percentage is in the large type category for 6%. The *Waist-hip Ratio* value of boys from housewife mothers have the highest percentage in the small type category around 74% and the lowest is in the large category for 4%.

Tabel 8: Waist-hip Ratio Value of the Girls

		Girls from Working Mothers		Girls from Housewife Mothers	
		Frequency	Percentage	Frequency	Percentage
Valid	Small	46	92.0	49	98.0
	Normal	4	8.0	1	2.0
	Total	50	100.0	50	100.0

The *Waist-hip Ratio* value of the girls in table 10 shows that the highest percentage from the working mother is on the small type category with a 92% and a 8% in normal type category. The highest percentage of *Waist-hip Ratio* value of the girls from housewife mothers is in the small type category with 98% and 2% for the normal type. Therefore, the small type served as the highest percentage but the large type did not appear in this sample.

The results from this research were the value of *Waist-hip* Ratio in the boys and girls from working mothers and housewives had the highest percentage in small type category. However, the large type did not appear in the girls' sample.

According to Anjani (2016), there is a significant difference in the boys' growth in the size of the abdominal circumference. There are genetic factors and environmental factors that are very influential in growth and development. Environmental factors are determinants of genetic/innate potential which could

be optimal or not. Because of the significant difference in the size of boy's abdominal circumference, therefore it showed that there are genetic factors which are influenced by environmental factors.

The research from Yunieswati (2014) found that boys had the highest percentage of body fat in normal and high category for around 37.5%, with the average on the high category, while most of the girls had 56.4% body fat with the normal average. Moreover, in Newanda (2011), children from a high level of economic status generally had bigger size compared to the children from a low level of economic status both for the girls and boys. a similar research also explained that there was no correlation between the status of the mother's occupation with the pre-school children's growth which was conducted in Pendidikan Anak Usia Dini (early childhood education programs) GMIM Bukit Hermon and Idhata Malalayang Kindergarten (Taju & Babakal 2015). There is also an estimation that 35 million of children around the world would experience obesity and this amount will be two times higher in 2020 (Onis, 2010).

5 CONCLUSION

This research showed that the value of *Waist-hip Ratio* in small type category served as the highest percentage in all sample. The percentage of the small type category in each sample was 64% of the boys from working mothers, 74% of the boys from housewives, 92% of the girls from working mothers, and 98% of the girls from a housewives. However, for the girls, the value of *Waist-hip Ratio* did not appear in the large type. The highest percentage also appeared on the girls who have not experienced menstruation yet at the age of 13th which were 78% from working mothers and 82% from housewife mothers.

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