

# Correlation Between Gender

*by* Made Sukma Putra

---

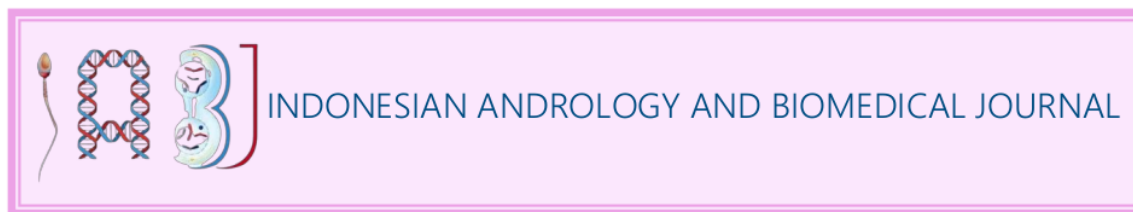
**Submission date:** 21-Jun-2023 03:36PM (UTC+0800)

**Submission ID:** 2120197518

**File name:** Correlation\_Between\_Gender.pdf (333.36K)

**Word count:** 3137

**Character count:** 16167



Original Research

## Correlation Between Gender, Physical Activity, Family Obesity History, and Consumption of Fruit or Vegetables with Obesity in Medical Students in Surabaya

Made Sukma Putra<sup>1\*</sup>, Lilik Djuari<sup>2</sup>, Rina Yudiwati<sup>3</sup>

<sup>1</sup> Medical Program, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

<sup>2</sup> Epidemiology, Disease Control, and Eradication Division, Departement of Public Health, Universitas Airlangga, Surabaya, Indonesia

<sup>3</sup> Departement of Medical Biology, Universitas Airlangga, Surabaya, Indonesia



### ARTICLE INFO

Received: May 27, 2022  
Accepted: June 24, 2022  
Published: June 30, 2022

\*) Corresponding author:  
E-mail:  
[madesukmaputra@gmail.com](mailto:madesukmaputra@gmail.com)

### Keywords:

Gender  
Physical Activity  
Family Obesity History  
Consumption of Fruit or Vegetables  
Nutritional Status

This is an open access article under the CC BY-SA license (<https://creativecommons.org/licenses/by-sa/4.0/>)



### Abstract

*The incidence of obesity in the world has increased recently and doubled from 1980 to 2014. Obesity can increase the risk of many diseases. Medical students are a vulnerable group affected by obesity because of stressful conditions that can increase the incidence of obesity. This analytical research uses a cross sectional method approach using primary data. The populations in this study were medical students at the Faculty of Medicine, Airlangga University. In this study, 300 samples were taken from first-fifth semester students. The independent variables that will be studied in this study are Gender, physical activity, family obesity history, and consumption of fruit or vegetables. The dependent variable in this study is nutritional status. Based on this study found a significant association between gender, family history of obesity, eating of fruits or vegetables to nutritional status. Still, there is no significant association between physical activity on the nutritional group of medical students. Three variables in this research correlated with the nutritional status of medical education students at the Faculty of Medicine, Airlangga University, Surabaya, which are gender, family obesity history, and consumption of fruit or vegetables. From this research, it was found that the incidence of over-nutrition was still high among medical education students and there was still a lack of awareness among students to exercise and consume fruit or vegetables in their meals.*

### 1. Introduction

The incidence of obesity worldwide has doubled from 1980 to 2014. In 2014, around 1.9 billion people over the age of 18 were overweight, and 600 million were obese. In other words, 39% of adults over the age of 18 were overweight and 13% of them were obese.<sup>1</sup> In Indonesia, the incidence of overweight and obesity is also quite high, there are over 13.5 percent are overweight and 15.4 percent are obese. The prevalence of the adult male population (> 18 years) who were obese in 2013 is 19.7 percent, higher than in 2007 (13.9%) and in 2010 (7.8%). In 2013, the prevalence of adult women (> 18 years) who was obese was 32.9 percent, up 18.1 percent from 2007 (13.9%) and 17.5 percent from 2010 (15.5%).<sup>2</sup>

### 2. Materials and Methods

This is analytical research using cross sectional method approach using primary data. This research was statistically analyzed by a correlation between 2 variables in one sample group. The populations in this study were medical students at the Faculty of Medicine, Airlangga University. The inclusion criteria in this study were

students of the doctor education study program at the faculty of medicine, Airlangga University. The exclusion criteria in this study were the students who were not willing to participate in the study. In this study, 300 samples were taken from first and fifth semester students.

The independent variables that will be studied in this study are Gender, physical activity, family obesity history, and consumption of fruit or vegetables. The dependent variable in this study is nutritional status. The statistical test used is a correlation with Pearson Chi-Square test. If P value  $\leq 0.05$ , then the statistical calculation shows that there is a meaningful correlation between the dependent variable and the independent variable, but if the value is  $> 0.05$ , then the statistical calculation shows that there is no correlation between the dependent variable and the independent variable. So that can be seen which factors are associated with nutritional status in medical education students at the Faculty of Medicine, Airlangga University.

### 3. Results

**Table 1.** Respondent’s Characteristics from 300 Students Majoring in Doctor Education, Faculty Of Medicine, Airlangga University.

Respondent's Characteristics	Total (n=80 )	Persentase (%)
Gender		
Male	108	36.0
Female	192	64.0
Total	300	100.0
Age		
17 years old	28	9.3
18 years old	141	47.0
19 years old	49	16.3
20 years old	70	23.3
21 years old	12	4.0
Total	300	100.0
Nutritional status based on BMI		
Underweight	43	14.3
Normal	197	65.7
Overweight	19	6.3
Obese	41	13.7
Total	300	100.0
Physical activity		
Not exercise	90	30.0
Do Exercise	210	70.0
Total	300	100.0

Family obesity history	Yes	136	45.3
	No	164	54.7
	Total	300	100.0
Consumption on fruit or vegetables	Not Consume fruit or vegetables	65	21.7
	Consume fruit or vegetables	235	78.3
	Total	300	100.0

**Table 2.** Result of Statistical Chi-Square Test of Factor Associated with Nutritional Status

Risk Factor	Category	Nutritional Status				Total (n=300)	P value	Contingency coefficient
		Underweight	Normal	Overweight %	Obese			
Gender	Male	14 (13%)	59 (54.6%)	10 (9.3%)	25 (23.1%)	108	0.001	0.230
	Female	29 (15.1%)	138 (71.9%)	9 (4.7%)	16 (8.3%)	192		
Physical activity	Yes	14 (15.6%)	56 (62.2%)	5 (5.6%)	15 (16.7%)	90	0.721	-
	No	29 (13.8%)	141 (67.1%)	14 (6.7%)	26 (12.4%)	210		
Family obesity history	Yes	12 (8.8%)	80 (58.8%)	14 (10.3%)	30 (22.1%)	136	0.000	0.283
	No	31 (18.9%)	117 (71.3%)	5 (3%)	11 (6.7%)	164		
Consumption on Fruit or Vegetable	Yes	5 (7.7%)	36 (55.4%)	3 (4.6%)	21 (32.3%)	65	0.000	0.279
	No	38 (16.2%)	161 (68.5%)	16 (6.8%)	20(8.5%)	235		

This research was conducted on 300 students majoring in medical doctor, Faculty of Medicine, Airlangga University. The respondents used in this study consisted of two classes, namely fifth semester students (class of 2013 generation) and first semester students (class of 2015 generation). The age group of the sample was 17-year-old respondents were 28 people (9.3%), 18 years old respondents were 141 people (56.3%), 19 years old respondents were 49 people (16.3%), 20 years old respondents were 70 people (23, 3%), and 21 years old respondents were 12 people (4%). Based on the results of the study and classified by the nutritional status, it was found that respondents who were underweight are 43 people (14.3%), respondents who had normal body weight are 197 people (65.7%), respondents who were overweight are 19 people (6.3%), and respondents who were obese are 41 people (13.7%). (Table 1)

Based on the results of this research on students majoring in doctor education, Faculty of Medicine, Airlangga University in the class of 2013 generation and 2015 generation the percentage of respondents who experienced nutrition as much as 20%, which are 6.3% were overweight and 13.7% were obese. This result is greater than the prevalence of overnutrition in East Java as much as 13.7, which are 6% were overweight and 7.7% were obese. 5

The data in this research was then analyzed statistically using a correlation between 2 variables in one sample group. Based on the result of statistical tests, it was found that the factors that statistically had a significant correlation with nutritional status were gender, family history of obesity, and consumption of fruit or vegetables. And there was no significant relationship between physical activity and the nutritional status of medical education students in Surabaya. (Table 2)

#### 4. Discussion

The prevalence of obesity in this research is greater than the incidence of obesity in medical students at AIMST University in Malaysia, which is 5.2%.<sup>6</sup> However, the prevalence of overweight and obesity in this research was lower than that conducted at International Medical University, Malaysia, which was as much as 30.1%.<sup>7</sup> From the data above, it can be concluded that there is still a high prevalence of obesity in the medical students in Surabaya. Whereas obesity can increase the risk of some diseases such as hypertension, osteoarthritis, coronary heart disease, gallbladder disease, dyslipidemia, insulin resistance, and others.<sup>8</sup>

Based on the results of statistical tests with Chi-Square correlation studies, showed a statistically significant correlation between gender and nutritional status (P value = 0.001 and contingency coefficient = 0.230). The results of this research correspond with the research conducted by Boo, NY et al. (2010) on medical students in Malaysia which found male sex was a risk factor associated with obesity.<sup>7</sup> The research conducted by Gopalakrishnan et al. (2012) also found that male sex was a risk factor for obesity in medical students in Malaysia.<sup>8</sup> The results of the Albert & Peng (2010) research of Connecticut public high school students also found that the male sex correlation with the incidence of overweight and obesity.<sup>9</sup> The research conducted by Rand et al. (1997) found that women wanted to be thinner and more likely to feel their body size was bigger than men.<sup>10</sup> The results of an article review by Kanter and Cabalero (2012) say that men will increase their risk becoming obese when their friends are obese, whereas this does not happen to women. In terms of culture, obese women will get more pressure to be thin and a culture that emphasizes thin body image on women will cause there are more obese men than women.<sup>11</sup>

The research result by Sherwood et al. (2000) found that increasing body weight is less common in individuals with more physical activity than those who do not.<sup>12</sup> From an article review conducted by Chaput, et al. (2011), concluded that physical activity is needed to prevent weight gain and can be done to lose body weight. Medical students usually gain more body weight than others because of a lack of physical activity.<sup>13</sup> This statement is supported by the results of a study by Tongprasert et al. (2014) which, states that the physical health of medical students is lower than Thai people in general, which indicates the low physical activity of medical students compared to the general population.<sup>14</sup>

Overweight and obesity can occur when fewer calories are released than those that enter. Physical activity and entering energy need to be considered in energy balance. Because physical activity is an important factor in whether someone can decrease, maintain and even increase their body weight. Regular physical activity also helps a person hold the percentage of body fat in children and adolescents (Leavitt, M., 2008).<sup>15</sup> In this research, the results of statistical tests with Chi-Square correlation study showed no significant correlation between physical activity and nutritional status (P-value = 0.721). This might be due to data collection on physical activity only obtained from questionnaires so that it might be less valid, besides it was also caused in this study using a cross sectional technique so it was not known whether physical activity carried out on samples was carried out before or after having more body weight. However, it was found that there was a tendency for a group that doing physical activity to have normal body weight which also fewer to have overweight and obese, and fewer who have underweight.

Based on the results of this research, a statistical test with the Chi-Square Chi-Square correlation study showed that there was a significant relationship between the family obesity history and nutritional status (P-value = 0,000, the value of the contingency coefficient = 0.283). The results of this study are in accordance with the study of Sande et al. (2001) which was conducted on 5389 people in Gambia, West Africa indicating that someone who has a family obesity history has a greater BMI and an increased risk of obesity.<sup>16</sup>

Genetics affects the development of obesity through several mechanisms, which are related to macronutrients, energy expenditure and hormonal. Micronutrient factors include preferred foods, lipolysis and regulation of appetite. Energy expenditure factors include metabolic and hormonal rates such as insulin sensitivity and work from leptin.<sup>8</sup> Culture can also affect obesity through attitudes and behaviors that affect food input and energy expenditure. This culture includes the symbolic meaning and social function of food, food portions, attitudes and motivations for body weight loss, psychosocial factors, activities that are more chosen during leisure time, social support to reduce weight and improve exercise, etc.

Based on the results of this research, statistical tests using the Chi-Square correlation study showed that there was a relationship between fruit or vegetable consumption and nutritional status (P value = 0,000, contingency coefficient = 0.279). The results of this study are in accordance with the research of He et al (2004) which used a sample of



74,063 female nurses and found that increasing the consumption of vegetables and fruit would be beneficial to reduce the incidence of weight and obesity.<sup>17</sup>

Consumption of fruit or vegetables has a correlation between body weight through food density and satiety which both of them affect the number of calories consumed. Some factors that have a large influence on food density and satiety are water, fat, and fiber. Fruits and vegetables have a low energy density because they consist of a lot of water and fiber, but are low in fat. Thus, the consumption of fruit or vegetables to replace energy-dense foods is a good way to regulate body weight.<sup>18</sup>

## 5. Conclusions

Three variables in this research had a correlation with the nutritional status of medical education students at the Faculty of Medicine, Airlangga University, Surabaya, which are gender (P-value = 0.001), family obesity history (P-value = 0,000), consumption of fruit or vegetables (P-value = 0,000). There was no statistically significant correlation between physical activity and nutritional status of medical education students at the Faculty of Medicine, Airlangga University, Surabaya (P-value = 0.721), but the groups that did exercise fewer respondents than overweight and obese.

From this research, it was found that the incidence of over-nutrition was still high in medical education students and there was still a lack of awareness among students to exercise and consume fruit or vegetables in their meals. It is recommended that medical education students pay more attention to their activities, vegetables or fruit consumed, and their body weight because they will give education and give examples of a healthy lifestyle to their patients in the future.

## Acknowledgement

We would like to thank Dr. Soetomo General Hospital for the support for this article.

## Authors' Contributions

All authors have contributed to the final manuscript. The contribution of each author as follow: collected the data, drafted the manuscript and designed the figures, devised the main conceptual ideas and critical revision of the article. All authors discussed the results and contributed to the final manuscript.

## Conflict Of Interest

The authors state there is no conflict of interest.

## Funding Information

This work does not receive any funding.

## References

1. World Health Organization. *Obesity and Overweight* [Internet], <http://www.who.int/mediacentre/factsheets/fs311/en/> (2015)
2. Riskesdas. Riset Kesehatan Dasar 2013. *Labdata.litbang.kemkes.go.id*.
3. Marti A, Moreno-Aliaga MJ, Hebebrand J, et al. Genes, Lifestyles and Obesity. *Int J Obes Relat Metab Disord J Int Assoc Study Obes* 2004; 28 Suppl 3: S29-36.
4. Jayaraj, Nair PP, Napoleon, et al. Prevalence of Overweight and Obesity Among Students of a Medical College in South India: A Pilot Study.
5. Kesehatan K. *Laporan Riskesdas 2007*. Jakarta, <http://terbitan.litbang.depkes.go.id/penerbitan/index.php/blp/catalog/download/63/92/240-1> (2008).
6. Gopalakrishnan S, Ganeshkumar P, Prakash MVS, et al. Prevalence of Overweight/Obesity among The Medical Students, Malaysia. *Med J Malaysia* 2012; 67: 442–444.
7. Boo NY, Chia GJQ, Wong LC, et al. The Prevalence of Obesity Among Clinical Students in A Malaysian Medical School. *Singapore Med J* 2010; 51: 126–132.
8. World Health Organization. *Obesity Preventing and Managing the Global Epidemic*,. 1998.
9. Albert, M and Peng J. Gender-Specific Factors Associated with Obesity or Overweight in Adolescents: Connecticut's 2009 Youth Risk Behavior Survey.
10. Rand CS, Resnick JL, Seldman RS. Assessment of Socially Acceptable Body Sizes by University Students. *Obes Res* 1997; 5: 425–429.
11. Kanter R, Caballero B. Global Gender Disparities in Obesity: A Review. *Adv Nutr* 2012; 3: 491–498.
12. Sherwood NE, Jeffery RW, French SA, et al. Predictors of Weight Gain in The Pound of Prevention Study. *Int J Obes Relat Metab Disord J Int Assoc Study Obes* 2000; 24: 395–403.
13. Chaput J-P, Klingenberg L, Rosenkilde M, et al. Physical Activity Plays An Important Role

- in Body Weight Regulation. *J Obes*; 2011. Epub ahead of print 2011. DOI: 10.1155/2011/360257.
14. Tongprasert S, Klaphajone J, Yaicharoen P. Physical Fitness of Fourth-Year Medical Students At Chiang Mai University. *Chiang Mai Med J* 2014; 53: 7–14.
  15. Leavitt M. Physical Activity Guidelines for Americans. Washington : U.S. Department of Health and Human Services, 2008.
  16. van der Sande MA, Walraven GE, Milligan PJ, et al. Family History: an Opportunity for Early Interventions and Improved Control of Hypertension, Obesity and Diabetes. *Bull World Health Organ* 2001; 79: 321–328.
  17. He K, Hu FB, Colditz GA, et al. Changes in Intake of Fruits and Vegetables in Relation to Risk of Obesity and Weight Gain Among Middle-Aged Women. *Int J Obes Relat Metab Disord J Int Assoc Study Obes* 2004; 28: 1569–1574.
  18. Reichmann V. 'Does Fruit and Vegetable Intake Decrease Risk for Obesity in Children and Adolescents?', 2009.

# Correlation Between Gender

---

## ORIGINALITY REPORT

---

13%

SIMILARITY INDEX

12%

INTERNET SOURCES

6%

PUBLICATIONS

0%

STUDENT PAPERS

---

## PRIMARY SOURCES

---

1	<a href="http://digitalcommons.usu.edu">digitalcommons.usu.edu</a> Internet Source	1%
2	<a href="http://hdl.handle.net">hdl.handle.net</a> Internet Source	1%
3	<a href="http://mattioli1885journals.com">mattioli1885journals.com</a> Internet Source	1%
4	<a href="http://repository.unar.ac.id">repository.unar.ac.id</a> Internet Source	1%
5	<a href="http://text-id.123dok.com">text-id.123dok.com</a> Internet Source	1%
6	<a href="http://pjmhsonline.com">pjmhsonline.com</a> Internet Source	1%
7	<a href="http://garuda.kemdikbud.go.id">garuda.kemdikbud.go.id</a> Internet Source	1%
8	<a href="http://damaacademia.com">damaacademia.com</a> Internet Source	1%
9	<a href="http://www.degruyter.com">www.degruyter.com</a> Internet Source	<1%

---



10	<a href="http://www.tandfonline.com">www.tandfonline.com</a> Internet Source	<1 %
11	Muhammad Fachri, Mochammad Hatta, Firda Muthi Ubaidah, Risky Akaputra et al. "Comparison of treatment among pulmonary tuberculosis patients with and without Covid-19 and the impact of type 2 DM", Research Square Platform LLC, 2023 Publication	<1 %
12	<a href="http://photonics.pl">photonics.pl</a> Internet Source	<1 %
13	<a href="http://www.njpppp.com">www.njpppp.com</a> Internet Source	<1 %
14	<a href="http://www.researchsquare.com">www.researchsquare.com</a> Internet Source	<1 %
15	<a href="http://innovareacademics.in">innovareacademics.in</a> Internet Source	<1 %
16	<a href="http://www.researchgate.net">www.researchgate.net</a> Internet Source	<1 %
17	<a href="http://www.scielo.br">www.scielo.br</a> Internet Source	<1 %
18	D T Simeon, R D Rattan, K Panchoo, K V Kungeesingh, A C Ali, P S Abdool. "Body image of adolescents in a multi-ethnic Caribbean	<1 %

population", European Journal of Clinical Nutrition, 2003

Publication

19

Gabrielle Maston, Hamid Reza Kahlaee, Janet Franklin, Elisia Manson et al. "Real World Adherence to a Severely Energy Restricted Meal Replacement Diet in Participants with Class II and III Obesity", *Obesities*, 2022

Publication

<1 %

20

M. J. Müller, M. Mast, I. Asbeck, K. Langnäse, A. Grund. "Prevention of obesity – is it possible?", *Obesity Reviews*, 2001

Publication

<1 %

21

Sun, Juan, He Yi, Zhiyue Liu, Yan Wu, Jiang Bian, Yanyan Wu, Yuki Eshita, Gaimei Li, Qing Zhang, and Ying Yang. "Factors associated with skipping breakfast among Inner Mongolia Medical students in China", *BMC Public Health*, 2013.

Publication

<1 %

22

[www.ijclinicaltrials.com](http://www.ijclinicaltrials.com)

Internet Source

<1 %

23

[www.minervamedica.it](http://www.minervamedica.it)

Internet Source

<1 %

24

[www.tehqeeqat.org](http://www.tehqeeqat.org)

Internet Source

<1 %

[doi.org](http://doi.org)

25

Internet Source

<1 %

---

26

[www.advrehab.org](http://www.advrehab.org)

Internet Source

<1 %

---

Exclude quotes      On

Exclude matches      Off

Exclude bibliography      On

# Correlation Between Gender

---

GRADEMARK REPORT

---

FINAL GRADE

**/100**

GENERAL COMMENTS

**Instructor**

---

PAGE 1

---

PAGE 2

---

PAGE 3

---

PAGE 4

---

PAGE 5

---

PAGE 6

---