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Original Research Article

Relationship between morphometric indices and cardiovascular risk factors in patients undergoing coronary artery bypass graft surgery

Khosrow Hashemzadeh[1], Marjan Dehdilan[2]*

[1] Department of Heart Surgery, Tuberculosis and Lung Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran. (Orcid: 0000-0001-5551-906X Email:Dr.hashemzadehtbzmed@yahoo.com)

[2] Department of Anesthesiology, Tuberculosis and Lung Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

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ABSTRACT

Introduction: Reducing complications and death from heart disease depends on recognizing risk factors and educational planning to correct these factors. By using the relevant research, it is possible to help improve the cardiovascular health of these people. In order to achieve these goals, the present study intends to investigate the relationship between morphometric indices and cardiovascular risk factors in patients undergoing coronary artery bypass graft surgery. **Material and Methods:** In this descriptive-analytical study, anthropometric indices of 158 candidates for coronary artery bypass graft surgery referred to Shahid Madani Hospital (Tabriz University of Medical Sciences) were measured and its relationship with the incidence of cardiovascular disease and the need for surgery was investigated. **Results:** Explanation coefficient values also showed that each of the blood sugar indices, WHtR, BF and BMI, alone accounted for 8.9%, 6.9%, 6.9% and 7.7% of Tcho changes in men, respectively. **Conclusion:** It seems that patients who are candidates for coronary artery bypass graft surgery are prone to cardiovascular risk factors due to their sedentary occupation on the one hand and little control over their diet on the other. Early detection of cardiovascular disease and risk factors in these people can have very positive results in reducing the incidence of these diseases.

Keywords: morphometric, risk factors, coronary artery bypass graft

***Corresponding Author: Orcid: 0000-0001-8119-3198**
E-mail: Marjandehdilani@gmail.com

Introduction

Overweight and obesity are major health problems in the world today. This problem with many diseases such as; Cardiovascular complications, hypertension, atherosclerosis, chronic inflammation, fat disorders, insulin resistance, diabetes and other metabolic disorders are associated. Obesity changes the structure and function of the heart by increasing the volume of hemodynamics [1]. This problem in particular leads to: 1) increased left ventricular volume and deformation, 2) systolic and diastolic blood pressure disorders, 3) left atrial dilatation and changes in its function, and 5) accumulation of fat around the heart[2]. The link between obesity and cardiovascular events appears to be due in part to the association of obesity with the classical risk factors for hypertension, diabetes, and hyperlipidemia. In fact, it seems that many diseases and health problems in the presence of obesity and with increasing body mass index are likely to be more problematic [3]. At the beginning of th e twentieth century, cardiovascular disease accounted for about 10% of deaths worldwide, but by the end of the century it accounted for about 50% of deaths in underdeveloped countries and 25% in developing countries. By 2020, it will lead to the death of approximately 25 million people worldwide. In addition, these diseases impose huge costs on the health care system of countries [4]. Therefore, determining the exact boundaries for obesity in any society and determining its relationship with health threats can play an important role in reducing mortality from obesity-related diseases on the one hand, reducing the social and financial costs of Have the other side [5]. Research on bodybuilding factors has suggested various indicators, the most important of which are body fat percentage, fat mass index, body mass index, lean weight, waist circumference and waist-to-hip ratio. In recent years, many studies have examined the relationship between waist circumference as an easy and inexpensive indicator for measuring central body obesity and predicting the risk of chronic diseases [6]. Waist circumference is strongly correlated with visceral fat in both men and women; Therefore, it is often used in conjunction with BMI to determine the risk of cardiovascular disease. Conversely, some studies have reported that WC and WHR are better indicators of the risk of cardiovascular disease than body mass index. While WHR compared to BMI is known as an increased risk factor for dyslipidemia, hypertension, cardiovascular disease and diabetes. Waist and hip circumference provide information on how body fat is distributed [7, 12-14]. These variables are influenced by lifestyle factors such as smoking, alcohol consumption

and physical activity. The WHR is the most commonly used indicator of abdominal obesity in the waist-to-hip ratio, which distinguishes genoid (serine) and android (abdominal) obesity. People with higher abdominal fat accumulation have a higher risk of developing diabetes, high blood pressure and cardiovascular disease [8, 18-20]. Inactivity and improper diet are associated with increased indicators and the occurrence of cardiovascular events and premature death. People seem to be prone to cardiovascular risk factors due to occupational inactivity and limited control over nutrition [9, 15-17]. Reducing complications and death from heart disease depends on recognizing risk factors and educational planning to correct these factors. By using the relevant research, it is possible to help improve the cardiovascular health of these people. In order to achieve these goals, the present study intends to investigate the relationship between morphometric indices and cardiovascular risk factors in patients undergoing coronary artery bypass graft surgery.

Material and Methods

Study design: This study was performed on 158 people living in Sehr, Tabriz who were candidates for coronary artery bypass graft surgery; 30 women and 128 men with an age range of 30 to 65 years were performed in 2018. After obtaining the necessary permits, body measurements were performed in the gym by a health expert.

Inclusion and exclusion criteria: Coronary artery bypass graft surgery candidate, age over 18 years and consent to participate in the study were the inclusion criteria and previous surgical history, history of congenital heart disease and dialysis history were also among the exclusion criteria of this study.

Methodology*:* The method was to communicate with colleagues and inform them of the schedule for body measurement and blood sampling measurements. The test time was the same for everyone and at least three hours after breakfast. All subjects observed the test-taking considerations, including emptying the bladder and intestines and not eating or drinking before the test. Necessary explanations were given to the individuals and in cases where the respondents had ambiguities, the ambiguities were removed as much as possible with the explanations of the researcher. All subjects then completed a consent form to participate in the project. Completing

the consent form and being a volunteer from the entry conditions and things like; Medication, pregnancy, any infectious disease, diabetes, hypertension was considered as exclusion criteria. The weight of the people was done using Seca hand scales (Seca made in Germany, model 769 (with an accuracy of 100 grams), in terms of kilograms without shoes and with light clothes. Standing and without shoes was measured with an accuracy of 0.1 cm to measure waist circumference while the subject was standing without upper body covering, the circumference of the narrowest part of the trunk in the middle of the distance between the last rib and the crown was measured with a tape measure. During the measurement, the subject was instructed to refrain from contracting the abdominal muscles and to stand normally and comfortably. The hip circumference was measured using a tape measure using the tape measure of the widest part of the hip. Waist-to-hip ratio (WHR) was obtained by dividing the waist by the hip, and waist-to-height ratio (WHtR) was obtained by dividing the waist by the height in centimeters. Hip circumference greater than or equal to 0.8 and waist-to-height ratio greater than or equal to 0.5, which determines female obesity overweight, were considered as international boundaries. Also, body mass index was obtained by dividing a person's weight in kilograms by the second power (x^2) of height in meters. BMI greater than or equal to 25 kg / m2 was considered overweight and obesity. Also, blood sampling after fasting at night and resting in a suitable place, at a temperature of 22 ° C and completely healthy by the blood sampling specialist of Laboratory of Tabriz with the help of Scalpvin at 30.8 in the morning and each time in the amount of 10 ml in the sitting position of the subjects' left anterior vein was assessed to assess the serum levels of total cholesterol (TCho), triglyceride (TG), HDL, LDL and VLDL. To separate the serum, the samples were centrifuged at room temperature at 3000 rpm for 10 minutes, and the serum isolated from the rest of the blood was incubated in 1 ml microtubes, and tested at -80 ° C. Were kept at Celsius. Concentrations of blood biochemical indices were determined by enzymatic colorimetric method using Pars Azmoun commercial kits. The coefficient of variation inside and outside the test for cholesterol was 2%. All experiments were performed in laboratory in Tabriz. The laboratory meets the standards of the Ministry of Health Central Laboratory and is standardized with the University of St Rafae, Brussels and Belgium. In addition, in this research, all cases of ethics in the research have been observed and in order to observe professional ethics, the researcher assured them that the information will be kept completely confidential with the

researcher and the results obtained are completely confidential and the information of each person. Only he will be informed.

Data analysis: The collected data were analyzed through descriptive and inferential statistical methods. Descriptive statistics were used to examine the characteristics of the subjects including age, weight, gender, marital status, degree and field of study. Pearson correlation coefficient test was used to examine the relationship between variables and independent t-test was used to compare the two groups of men and women. It should be noted that for data analysis, SPSS software version 21 was used and a significant level was considered for performing calculations ($p < 0.05$).

Ethical Considerations: It is worth mentioning that the whole process of the present study was carried out after the approval and approval of the ethics committee of Tabriz University of Medical Sciences (NO: IR.TBZMED.REC.1399.767).

Results

The results of this study showed that there was a significant difference between male and female subjects in body mass indexes except BMI index in other indices ($p < 0.05$). There was no significant difference in cardiovascular risk factors between male and female subjects in Tcho, Tg and FBS indices, but this difference was significant in HDL and LDL. In addition, the findings of this study showed that in women there was a significant and inverse relationship between HDL and hip circumference ($p < 0.05$). Explanation coefficient values showed that 4.26% of the variance occurred in the HDL of women in the sample could be explained by changes in their hip circumference. Also, there was a positive and significant relationship between blood sugar levels in women with body mass indexes, waist circumference, WHR, WHtR and BMI ($p < 0.05$). Each of the WHR, WHtR, waist, BMI and weight indices alone explained 69.6%, 5.56%, 1.56%, 3.28% and 2.28% of changes in women's blood sugar, respectively. they do. But the relationship between Tcho and LDL with morphometric indices in women was not significant ($p < 0.05$). The results of this study showed that there was a significant difference between male and female subjects in body mass indexes except BMI index in other indices ($p < 0.05$). There was no significant difference in cardiovascular risk factors

between male and female subjects in Tcho, Tg and FBS indices, but this difference was significant in HDL and LDL. In addition, the findings of this study showed that in women there was a significant and inverse relationship between HDL and hip circumference ($p < 0.05$). Explanation coefficient values showed that 4.26% of the variance occurred in the HDL of women in the sample could be explained by changes in their hip circumference. Also, there was a positive and significant relationship between blood sugar levels in women with body mass indexes, waist circumference, WHR, WHtR and BMI ($p < 0.05$). Each of the WHR, WHtR, waist, BMI and weight indices alone explained 69.6%, 5.56%, 1.56%, 3.28% and 2.28% of changes in women's blood sugar, respectively. But the relationship between Tcho and LDL with morphometric indices in women was not significant ($p < 0.05$). While in men, there was a positive and significant relationship between Tcho variable and height gauges, WHtR, BMI and BF ($p < 0.05$). Explanation coefficient values also showed that each of the blood sugar indices, WHtR, BF and BMI, alone accounted for 8.9%, 6.9%, 6.9% and 7.7% of Tcho changes in men, respectively. In addition, men's blood glucose had a positive and significant relationship with WHtR, BMI and BF body measurement indices and a negative and significant relationship with height index ($p < 0.05$), each of BMI, BF, WHtR and height indices alone, respectively. 15.5%, 4.15%, 9% and 9.8% explain the changes in blood sugar in men.

Discussion

The aim of this study was to investigate the relationship between morphometric indices and cardiovascular risk factors in patients undergoing coronary artery surgery. The results of this study showed that there is a significant relationship between a large number of body mass indexes and cardiovascular risk factors, so that in women there is a significant and inverse relationship between hip circumference and HDL and between weight, waist circumference, WHR, WHtR and BMI had a positive and significant relationship with their blood sugar level ($p < 0.05$). In men, there was a positive and significant relationship between height, WHtR, BMI and BF indices with Tcho variable and between WSR, BMI and BF indices with their blood sugar ($p < 0.05$). In line with the results of this study, a study comparatively evaluated anthropometric indices for the diagnosis and screening of overweight and obesity and the determination of appropriate boundaries in young girls [10, 21-23]. The results of this study showed that the surface area of the curve for waist circumference and waist-to-height ratio were

0.918 and 0.920, respectively, which were not significantly different from each other. But it was significantly higher than the waist to hip ratio. The results of a study by other researchers in 2015 showed that all anthropometric indices studied, such as waist circumference and waist-to-hip ratio, were strongly and significantly associated with cardiac risk factors. Another study found that people with higher than standard WC or BMI levels were more likely to develop hypertension, dyslipidemia, and overall heart disease than those with lower WC and BMI [11, 24-26]. Another study showed that BMI, WC and WHR were higher than normal among men and PBF was higher than normal in women and there was a significant relationship between BMI and WC [12, 27-29]. The results of this study also showed that there was a positive and significant relationship between weight, waist circumference, WHR, WHtR and BMI with women's blood sugar ($P < 0.05$). So that each of the indicators of WHR, WHtR, waist circumference, BMI and weight, alone 9.69%, 5.56%, 1.56%, 3.28% and 2.28% of changes in women's blood sugar, respectively. Explain. In men, WHtR, BMI, BF and height indices had a positive and significant relationship with blood sugar ($p < 0.05$), each of BMI, BF, WHtR and height indices alone were 5.15%, 4.15%, respectively. Explain%, 9% and 9.8% of changes in blood sugar in men[13]. Consistent with these findings, a study reported blood glucose levels in Singaporean men and women at 6.4 and 5.4 mmol / L, respectively. They also reported that men's blood sugar had a positive and significant relationship with BMI, BF, WSR, WC and HC. In one study, more than 28% of subjects had blood sugar above 150 mg / dL and about 62% had blood sugar above 126 mg / dL, while the findings of this study showed that in a population that They had high blood sugar, the prevalence of cardiovascular disease was higher. Other researchers in a study aimed at determining the frequency of some cardiovascular risk factors and their relationship with gender in nurses reported high blood sugar, 5.11% of nurses at high levels. In a study to investigate the prevalence of cardiovascular disease risk factors in taxi drivers in Yazd, researchers stated that the subjects' blood sugar level was 62.101 mg / dL, which shows a high level. In another study, blood glucose levels of men and women in Qazvin were reported to be 5.99 and 8.99 mmol / L, respectively [5, 30-32].

Conclusion

It seems that patients who are candidates for coronary artery bypass graft surgery are prone to cardiovascular risk factors due to their sedentary occupation on the one hand and little control

over their diet on the other. Early detection of cardiovascular disease and risk factors in these people can have very positive results in reducing the incidence of these diseases. According to the findings, it can be said that the higher the body mass index, the higher the level of cardiovascular risk factors. To solve these problems, training and obtaining sufficient information to perform monitoring and prevention measures, as well as encouraging appropriate physical activity, is recommended to improve body measurement indicators.

References

1. K. Solo, S. Lavi, C. Kabali, G. N. Levine, A. Kulik, A. A. John-Baptiste, S. E. Fremes, J. Martin, J. W. Eikelboom, M. Ruel, bmj., 367(2019)
2. K. Hashemzadeh, M. Dehdilani, M. K. Gol, Int J Womens Health Reprod Sci., 9:69(2021)
3. W. Q. Ma, X. J. Sun, Y. Wang, X. Q. Han, Y. Zhu, N. F. Liu, Obesity reviews., 19:1236(2018)
4. W.-Q. Ma, Y. Wang, X.-J. Sun, X.-Q. Han, Y. Zhu, R. Yang, N.-F. Liu, Coronary artery disease., 30:367(2019)
5. W. Wang, X. Zhou, X. Liao, B. Liu, H. Yu, Journal of anesthesia ., 33:543(2019)
6. M. Dehdilani, M. K. Gol, K. Hashemzadeh, Crescent Journal of Medical and Biological Sciences., 6:350(2019)
7. M. Jannati, M. R. Navaei, L. G. Ronizi, Journal of Family Medicine and Primary Care., 8:2768(2019)
8. L. Melly, G. Torregrossa, T. Lee, J.-L. Jansens, J. D. Puskas, Journal of thoracic disease., 10:1960(2018)
9. K. Hashemzadeh, M. Dehdilani, M. K. Gol, International Journal of Women's Health and Reproduction Sciences., 8:406(2020)
10. M. Correa-Rodríguez, M. Abu Ejheisheh, N. Suleiman-Martos, M. J. Membrive-Jiménez, A. Velando-Soriano, J. Schmidt-RioValle, J. L. Gómez-Urquiza, Journal of clinical medicine., 9: 909(2020)
11. N. A. Smart, G. Dieberg, N. King, Journal of the American College of Cardiology**.**, 71: 983(2018)
12. T. M. Kieser, D. P. Taggart, Journal of Cardiac Surgery., 33: 219-(2018)

13. K. Hashemzadeh, M. Dehdilani, M. K. Gol, Crescent Journal of Medical and Biological Sciences., 5: 517(2019)
14. A. Samimi, A. Bagheri, S. Dokhani, S. Azizkhani, E. Godini, International Journal of Basic & Applied Sciences 2:291 (2013)
15. R. Alimoradzadeh, H. Mirmiranpour, P. Hashemi, S. Pezeshki, SS. Salehi, Journal of Neurology & Neurophysiology, 10:1 (2019)
16. A. Samimi, International Journal of Innovation and Applied Studies 1:1 (2012)
17. R. Alimoradzadeh, MA. Abbasi, F. Zabihi, H. Mirmiranpour, Iranian Journal of Ageing, 15:524 (2021)
18. F. Zabihi, MA. Abbasi, R. Alimoradzadeh, Annals of the Romanian Society for Cell Biology, 1: 2573 (2019)
19. R. Alimoradzadeh, MA. Abbasi, F. Zabihi, H. Mirmiranpour, Iranian Journal of Ageing, 15:8 (2021)
20. A. Samimi, Journal of Engineering in Industrial Research 2:71 (2021)
21. K. Ghajarzadeh, M.M. Fard, H. Alizadeh Otaghvar, S.H.R. Faiz, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, M.R. Alebouyeh, Annals of the Romanian Society for Cell Biology, 25:2457 (2021)
22. K. Ghajarzadeh, M.M. Fard, H. Alizadeh Otaghvar, S.H.R. Faiz, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, M.R. Alebouyeh, Annals of the Romanian Society for Cell Biology, 25:2449 (2021)
23. A. Samimi, International Journal of Science and Engineering Investigations (IJSEI) 1:16 (2012)
24. K. Ghajarzadeh, M.M. Fard, M.R. Alebouyeh, H. Alizadeh Otaghvar, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, S.H.R. Faiz, Annals of the Romanian Society for Cell Biology, 25: 2466 (2021)
25. A. Samimi, Advanced Journal of Chemistry-Section A 4: 206 (2021)
26. R. Alimoradzadeh, H. Mirmiranpour, P. Hashemi, S. Pezeshki, S.S. Salehi, J. Neurology Neurophys., 10:1 (2019)
27. R. Alimoradzadeh, M. Mokhtare, S. Agah, Iran. J. Age., 12:78 (2017)
28. A. Samimi, A. Bagheri, S. Dokhani, S. Azizkhani, E. Godini, Intl J Inno Appl Stud 3:1086 (2013)

29. S. Etemadi, B. Mahmoodiyeh, S. Rajabi, A. Kamali, M.M. fard, Ann. Romanian Soc. Cell Biol., 25:2417 (2021)
30. S. Saedi, A. Saedi, MM. Ghaemi, M. Milani Fard, Eurasian Journal of Science and Technology, 2:180 (2021)
31. A. Samimi, Journal of Exploratory Studies in Law and Management 7:132 (2020)
32. A. Samimi, A. Bozorgian, M. Samimi, Journal of Engineering in Industrial Research 3:1-7 (2022)

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