JOURNAL MEDICAL INFORMATICS TECHNOLOGY
medinftech.org ISSN 2988-7003 (online)

Effects of Diet and Physical Activity on Coronary Heart Disease Risk Among Badminton Players

Eko Priyono[1*], *Sukrul Ma'mun*[2]

[1]*Badan Meteorologi Klimatologi dan Geofisika, Indonesia*
[2]*Badan Penanggulangan Bencana Daerah Provinsi DKI Jakarta, Indonesia*

ARTICLE HISTORY
Received: 21 June 24
Final Revision: 28 June 24
Accepted: 29 June 24
Online Publication: 30 June 24

KEYWORDS
Badminton, Chi-square Test, Coronary Heart Disease, Diet, Physical Activity

CORRESPONDING AUTHOR
epriyono.bmkg@gmail.com

DOI
10.37034/medinftech.v2i2.36

A B S T R A C T

Coronary heart disease is caused by the narrowing or blockage of coronary arteries due to the buildup of fat and cholesterol, which hinders blood flow to the heart. This study aims to determine the relationship between dietary patterns and physical activity with coronary heart disease in the badminton player community in Indonesia. This research uses a cross-sectional design. The sample was taken using accidental sampling, involving 100 badminton players from various clubs in Indonesia. Data were collected using a questionnaire on June 24-27, 2024, and analyzed with SPSS using the chi-square test. The results showed that 100% of respondents did not have coronary heart disease, 64% often consumed carbohydrates, 71% often consumed protein, 71% rarely consumed fat, 56% rarely consumed fiber, 73% rarely consumed cholesterol, and 79% had heavy physical activity. The chi-square test showed a significant relationship between heavy physical activity and a family history of coronary heart disease (p-value = 0.036) and a nearly significant relationship between fat consumption and a family history of coronary heart disease (p-value = 0.066). The odds ratio showed a significant value (p-value = 0.019). These results indicate that there may be a relationship between the variables tested, although the Pearson Chi-Square did not reach conventional significance, requiring further research for confirmation.

1. Introduction

Cardiovascular disease is the leading cause of death in the world, including in Indonesia, due to disorders of the heart and blood vessels. According to the World Health Organization, about 17.5 million people die each year from cardiovascular diseases, and 7.4 million (42.3%) of these deaths are caused by coronary heart disease (CHD) [1]. Coronary heart disease causes a decrease in the heart's ability to pump blood throughout the body, which can lead to heart failure [2].

The causes of coronary heart disease are divided into two categories: non-modifiable factors and modifiable factors. Non-modifiable factors include age, gender, and a family history of heart and vascular diseases or genetic factors. Meanwhile, avoidable risk factors involve lifestyle changes such as quitting smoking, managing diet, and exercising regularly. These risk factors include dyslipidemia (high cholesterol levels), hypertension, diabetes mellitus, smoking habits, obesity, and lack of exercise [3].

Individuals with coronary heart disease often have high cholesterol levels. An unhealthy lifestyle, such as poor diet, smoking, alcohol consumption, and lack of physical activity, contributes to increased cholesterol levels [4].

Physical activity can increase HDL levels and decrease LDL levels, thereby maintaining the balance of total cholesterol levels in the blood and reducing the risk of coronary heart disease [5]. Additionally, diet is closely linked to the occurrence of coronary heart disease. Consumption of high-fat foods can lead to the

accumulation of fat and cholesterol in the walls of coronary arteries, which hinders blood supply to the heart. Conversely, regular exercise can help maintain a balance in cholesterol and blood sugar levels, thereby reducing the risk of coronary heart disease [6].

The preliminary survey results in the badminton player community in 2024 showed that out of 100% of respondents, none had coronary heart disease [7]. The study found that 64% of respondents frequently consume carbohydrates, 71% frequently consume protein, 71% rarely consume fats, 56% rarely consume fiber, 73% rarely consume cholesterol, and 79% have heavy physical activity. The Chi-Square test results showed a significant relationship between respondents with heavy physical activity and a family history of coronary heart disease (p-value = 0.036) [8],[9]. There is an approaching significant relationship between respondents who frequently consume fats and a family history of coronary heart disease (p-value = 0.066) [10]. Although conventionally, no significant relationship was found at the 0.05 significance level between fat consumption and a family history of coronary heart disease, the odds ratio showed significance at 0.019, indicating a possible relationship between the tested variables, particularly based on the Odds Ratio. There was also no significant relationship found between diet patterns, carbohydrate consumption, protein, fiber, cholesterol, and coronary heart disease among badminton players.

The aim of this study was to determine the relationship between diet patterns and physical activity with the occurrence of coronary heart disease among the badminton community in Indonesia in 2024.

2. Research Method

Figure 1 explains each stage of the research. This research uses a descriptive-analytical design with a cross-sectional study approach.

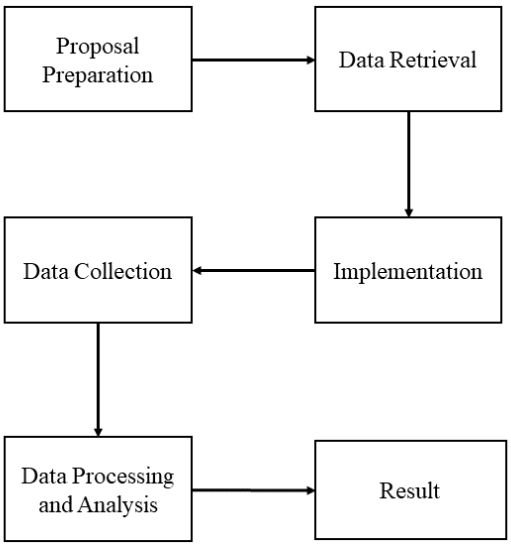


Figure 1. Research Stages

2.1 Proposal Preparation

At this stage, research plans to draft a research proposal. The proposal covers the background of the research, objectives, methodology, and implementation plan. Descriptive Analytic Design, this method is used to describe the characteristics of a population or phenomena being studied. This design allows researchers to explore relationships between variables without intervening with the research subjects. Cross-Sectional Study, is a study that collects data from a population at a specific point in time to evaluate the prevalence of certain outcomes [11].

2.2 Data Collection

This stage involves collecting data from the Indonesian badminton community. The sample was taken using accidental sampling with 100 respondents. Accidental Sampling, is a method of selecting samples where respondents who are easily accessible and willing to participate in the research are taken as the sample [12].

2.3 Research Implementation

The research was conducted in June 2024. At this stage, data collection was carried out according to the plan outlined in the proposal. Questionnaire Method, questionnaires were designed to collect information about the respondents' eating patterns and physical activities. Questionnaires are instruments used to obtain data from respondents by asking a series of previously prepared questions [13].

2.4 Data Collection

Data was collected during the period of June 24-27, 2024. Questionnaires were distributed to 100 respondents to gather information about eating patterns and physical activities. Research Variables, Independent Variables, eating patterns (frequency of carbohydrate, protein, fat, fiber, cholesterol consumption). Dependent Variables, coronary heart disease incidence. Information from the questionnaire is presented in Table 1.

Table 1. Demographic information, eating patterns, physical activity and history of coronary heart disease.

Variables	Questions
Demographic Information	Gender? Male /Female
	Age: _____ years
	Smoking History? Yes No
	Family History of Coronary Heart Disease? Yes No
Diet	How many carbohydrates do you consume in a day? Often/Not Often
	How much protein do you consume in a day? Often/Not Often
	How much fat do you consume in a day? Often/Not Often
	How much fiber do you consume in a day? Often/Not Often
	How much cholesterol do you consume in a day? Often/Not Often
Physical Activity	How much light physical activity do you do in a day? Often/Not Often

Variables	Questions
	How much moderate physical activity do you do in a day? Often/Not Often
	How much vigorous physical activity do you do in a day? Often/Not Often
History of Coronary Heart Disease	Have you ever experienced coronary heart disease? Yes No
	If yes, how long have you had coronary heart disease? _____ year

2.5 Data Processing and Analysis

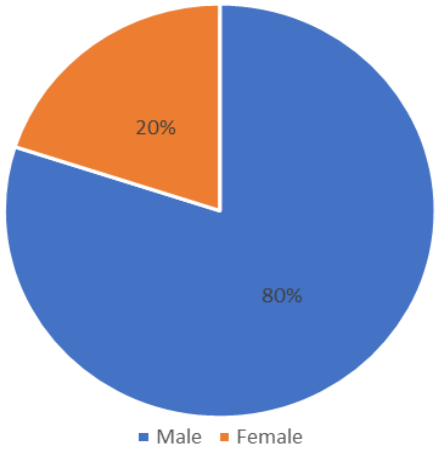
Data was processed and analyzed using statistical software SPSS. The Chi-Square test was used to analyze the relationship between independent variables (eating patterns and physical activities) and the dependent variable (coronary heart disease incidence). SPSS (Statistical Package for the Social Sciences), software used for statistical data analysis. SPSS allows researchers to perform various types of statistical tests, including Chi-Square. Chi-Square Test is a statistical test used to determine whether there is a significant relationship between two categorical variables [14].

3. Result and Discussion

The research was conducted in the Indonesian badminton community, starting from proposal preparation, and data collection, to research implementation in June 2024. With a sample size of 100 respondents. Data was collected using questionnaires designed to gather information about respondents' eating patterns and physical activities. Data collection period, data was collected during the period of June 24-27, 2024.

The results of the study on the Indonesian badminton player community in 2024 show demographic patterns and health conditions. Most respondents were under 50 years old. Based on Figure 2, the majority of respondents were male, comprising 80 individuals (80%), while females were 20 individuals (20%).

Figure 2. Respondent Demographics by Gender



Most respondents had a history of non-smoking, totaling 70 individuals (70%). Among the respondents with a history of smoking, 30 individuals (30%) had no family history of coronary heart disease. Thus, the data indicate that most of the smoking respondents did not experience coronary heart disease, suggesting a non-significant relationship between these factors in the studied population as shown in Table 2.

Table 2. The Relationship between Diet and Physical Activity and Coronary Heart Disease

Variable	PJK		TPJK		Total		p-value
	f	%	f	%	f	%	
Carbohydrate							0.499
often	6	6	58	58	64	64	
Not often	2	2	34	34	36	36	
Proteins							0.581
often	5	5	66	66	71	71	
Not often	3	3	26	26	29	29	
Fat							0.066
often	0	0	28	28	28	28	
Not often	8	8	64	64	72	72	
Fibrous							0.259
often	2	2	42	42	44	44	
Not often	6	6	50	50	56	56	
Cholesterol							0.894
often	2	2	25	25	27	27	
Not often	6	6	67	67	73	73	
Light Physical Activity							0.097
often	8	8	68	68	76	76	
Not often	0	0	24	24	24	24	
Moderate Physical Activity							0.199
often	7	7	60	60	67	67	
Not often	1	1	32	32	33	33	
Heavy Physical Activity							0.036
often	4	4	17	17	21	21	
Not often	4	4	75	75	79	79	

Based on Table 2, PJK is an abbreviation for coronary heart disease. TPJK stands for no coronary heart disease or without coronary heart disease. In the research results table, **f** represents the frequency or number of respondents in a specific category. **%** represents the percentage of the total respondents in that category. For example, 6% of respondents who frequently consume carbohydrates have coronary heart disease (PJK). 58% of respondents who frequently consume carbohydrates do not have coronary heart disease (TPJK).

It was found that more than half of the respondents (64%) frequently consume carbohydrates, and more than half (71%) frequently consume protein. Additionally, more than half (72%) also do not frequently consume fats. In contrast, more than half of the respondents (56%) do not frequently consume fiber, although another more than half (56%) do not frequently consume fiber. Most respondents (76%) have light physical activity levels. There is an approaching significant relationship between fat consumption and a family history of coronary heart disease with a p-value of 0.066, as well as a significant relationship between heavy physical activity and a family history of coronary heart disease in the Indonesian badminton player community in 2024.

3.1 Discussion

The research results indicate that 100% of the respondents did not experience coronary heart disease (CHD). Therefore, badminton players, even if their families have a history of coronary heart disease, show no indication of CHD occurrence [15]. Due to the respondents' health condition of having no history of coronary heart disease, those with a family history of coronary heart disease were used to analyze the relationship between the variables tested and coronary heart disease.

Among respondents with heavy physical activity, heavy physical activity shows a significant relationship with CHD (p-value < 0.05). Thus, it can be concluded that heavy physical activity has a significant relationship with CHD. These research findings align with a study by Ashar, I. (2024) that physical activity is associated with CHD [16].

Similarly, regarding fat, the Chi-Square test results showed a significance value (p-value) from Pearson Chi-Square of 0.066, which approaches the 0.05 significance level but remains above it. Thus, conventionally, there is no significant relationship between the tested variables at the 0.05 significance level. However, this value is close to the significance threshold, suggesting a relationship approaching significance. The Odds Ratio showed a significant value of 0.019, indicating a significant relationship at the 0.05 significance level. Therefore, there is an indication that there may be a relationship between the tested variables, especially based on the Odds Ratio, although Pearson's Chi-Square did not reach conventional significance. This may require further research to confirm these findings.

The findings of this study are consistent with previous research, indicating that saturated fat can elevate serum total cholesterol (TC) levels, consequently raising the risk of coronary heart disease [17]. A good and quality diet can help maintain a balance in cholesterol levels [18],[19],[20].

The consumption of carbohydrates, protein, cholesterol, and fiber does not have a significant relationship with coronary heart disease (p-value > 0.05). This study aligns with results indicating no significant relationship [21].

The research results indicate that most respondents have a balanced diet, with 64% frequently consuming carbohydrates and 71% frequently consuming protein. However, a majority of respondents do not frequently consume fats (72%) and fiber (56%). Heavy physical activity was also found among a significant portion of respondents (79%). Chi-square tests showed a significant relationship between respondents with heavy physical activity and a family history of coronary heart disease (CHD) (p-value = 0.036). There is also an approaching significant relationship between respondents who frequently consume fats and a family history of CHD (p-value = 0.066). Although conventionally, no significant relationship was found at the 0.05 significance level between fat consumption and family history of CHD, the odds ratio showed significance of 0.019, indicating a possible relationship between the tested variables.

4. Conclusion

This study shows that dietary patterns and physical activity are related to coronary heart disease (CHD) in the badminton player community in Indonesia. Heavy physical activity has a significant relationship with a family history of CHD (p-value = 0.038), while fat consumption has a nearly significant relationship (p-value = 0.066). However, there is no significant relationship between dietary patterns, carbohydrate consumption, protein, fiber, cholesterol, and CHD in badminton players. The study suggests that lifestyle changes such as managing diet and exercising regularly are crucial in preventing CHD. Therefore, it is recommended that badminton players consume a balanced diet and engage in regular physical activity. Further research is needed to confirm these findings and to explore the relationships between the variables tested.

References

[1] F. History, "Riwayat Keluarga dan Merokok terhadap Kejadian Jantung Koroner," vol. 6, no. 1, pp. 179–186, 2024.

[2] S. Anggraeni, E. Vestabilivy, dan M. Fatkhurrohman, "Asuhan Keperawatan pada Tn. R dan Tn. M yang Mengalami Penurunan Curah Jantung dengan Gagal Jantung Kongestif di RSUD dr. Chasbullah Abdulmadjid Kota Bekasi", *JPHI*, vol. 11, no. 40, hlm. 48-58, Feb 2024.

[3] A. R. Pangestu, S. Ibrahim, and F. Saftarina, "Penatalaksanaan Holistik Pada Wanita Usia 72 Tahun Dengan Hipertensi Dan Dislipidemia Melalui Pendekatan Kedokteran Keluarga Di Wilayah Kerja Puskesmas Rajabasa Indah," *J. Med. Malahayati*, vol. 8, no. 1, pp. 119–133, 2024, doi: 10.33024/jmm.v8i1.13612.

[4] A. Fusvita, S. A. Idris, and A. Umar, "PENYAKIT METABOLIK DI DESA RAU-RAU KECAMATAN RAROWATU KABUPATEN BOMBANA SULAWESI TENGGARA," vol. 6, pp. 184–192, 2024, doi: 10.30656/ps2pm.v6i1.8721.

[5] A. Martin, A. N. Jap, and N. Setia, "Program Pengabdian Masyarakat Untuk Edukasi Dan Deteksi Dini Dislipidemia Dan Obesitas Community Service Program for Education and Early Detection of Dyslipidemia and Obesity," vol. 2, no. 3, 2024.

[6] W. H. Ruslim, R. S. A. Aditya, and C. L. Putra, "Kegiatan Pengabdian Masyarakat Dengan Penilaian Rasio Apolipoprotein A Dan B Dalam Memantau Risiko Penyakit Jantung Pada Lansia," *kreatif*, vol. 4, no. 2, pp. 94–103, Jun. 2024, doi: 10.55606/kreatif.v4i2.3390.

[7] D. Cabello-Manrique, J. A. Lorente, R. Padial-Ruz, and E. Puga-González, "Play Badminton Forever: A Systematic Review of Health Benefits," *Int. J. Environ. Res. Public Health*, vol. 19, no. 15, 2022, doi: 10.3390/ijerph19159077.

[8] R. Yulendasari, U. C. A. S. Isnainy, and R. A. Pradisca, "Hubungan Antara Aktivitas Fisik Dan Riwayat Keluarga Dengan Kejadian Penyakit Jantung Koroner Di Puskesmas

Banjarsari Kota Metro," *Malahayati Nurs. J.*, vol. 3, no. 2, pp. 181–191, 2021, doi: 10.33024/mnj.v3i2.3203.

[9] D. P. M. Ni Kadek, N. L. P. D. Puspawati, and K. Lisnawati, "Hubungan Efikasi Diri dengan Aktivitas Fisik Pada Pasien Penyakit Jantung Koroner," *J. Nurs. Res. Publ. Media*, vol. 2, no. 1, pp. 29–38, 2023, doi: 10.55887/nrpm.v2i1.26.

[10] L. F. Tampubolon, A. Ginting, and F. E. Saragi Turnip, "Gambaran Faktor yang Mempengaruhi Kejadian Penyakit Jantung Koroner (PJK) di Pusat Jantung Terpadu (PJT)," *J. Ilm. Permas J. Ilm. STIKES Kendal*, vol. 13, no. 3, pp. 1043–1052, 2023, doi: 10.32583/pskm.v13i3.1077.

[11] E. S. Romadhona, M. Elvandari, and U. S. Karawang, "Hubungan Pengetahuan Gizi dengan Indeks Massa Tubuh Pada Mahasiswa MSIB SEAMEO RECFON," vol. 4, pp. 15886–15895, 2024.

[12] F. Y. Y. Roempoembo and E. Winarti, "Pengaruh Metode Penyuluhan Audiovisual Terhadap Tingkat Pengetahuan dan Perilaku Keluarga Dalam Pencegahan Penyakit Tuberkulosis," *J. Kesehat. Tambusai*, vol. 5, no. 1, pp. 1252–1273, 2024.

[13] M. Yasin, S. Garancang, and A. A. Hamzah, "Metode Dan Instrumen Pengumpulan Data Penelitian Kuantitatif dan Kualitatif," *J. Int. Multidiscip. Res.*, vol. 2, no. 3, pp. 162–173, 2024.

[14] D. Herinanto, B. H. S. Utami, H. Helmita, and D. Arif, "Analisis Chi Square Zona Wilayah Marketing terhadap Penjualan Produk Ekonomi Kreatif," *eCo-Buss*, vol. 6, no. 3, pp. 1626–1637, 2024, doi: 10.32877/eb.v6i3.1240.

[15] O. Atieh *et al.*, "Paternal peri-conceptional physical activity and the risk of congenital heart disease in offspring: A case–control study," *Andrology*, no. March, pp. 1–11, 2024, doi: 10.1111/andr.13639.

[16] I. Pashar, "Hubungan Pola Makan Dan Aktivitas Fisik Dengan Penyakit Jantung Koroner Di Rsud Labuang Baji Makassar," *J. Pubnursing Sci.*, vol. 2, no. 01, pp. 31–42, 2024, doi: 10.69606/jps.v2i01.104.

[17] V. Nomor *et al.*, "Jurnal Inovasi Kesehatan Adaptif PASIEN RAWAT JALAN DI RS PERTAMINA BINTANG AMIN," vol. 6, no. December 2023, pp. 36–47, 2024.

[18] S. F. A. Zulfikar, N. F. Az-Zahra, and D. O. Radianto, "Pemanfaatan Kulit Tahu dalam Industri Pangan dan Kesehatan: Tinjauan Pustaka tentang Potensi Nutrisi, Komponen Bioaktif, dan Aplikasi dalam Pengobatan dan Suplemen Makanan," *J. Mhs. Ilmu Farm. dan Kesehat.*, vol. 1, no. 3, pp. 49–55, 2023.

[19] K. Rofidah *et al.*, "Membangun Kesehatan Dari Dalam Dengan Menu Sehat Berprotein Tinggi," *J. Ilmu Kesehat. dan Gizi*, vol. 2, no. 3, pp. 06–19, 2024, [Online]. Available: https://prin.or.id/index.php/jig/article/view/2933

[20] C. Suarsih, "Hubungan Pola Makan Dengan Kejadian Kolestrol Pada Lansia Di Wilayah Kerja Puskesmas Tambaksari," *J. Keperawatan Galuh*, vol. 2, no. 1, 2020, doi: 10.25157/jkg.v2i1.3583.

[21] R. P. I. Lestari, Harna, and A. Novianti, "Hubungan Kebiasaan Olahraga, Rasio Lingkar Pinggang Pinggul, dan Kebiasaan Merokok dengan Kadar Kolesterol Total Pasien Poliklinik Jantung," Svasta Harena: Jurnal Ilmiah Gizi, vol. 1, no. 1, pp. 18–30, Sep. 2020, doi: 10.33860/shjig.v1i1.117.