Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i6.6985

BEYOND MEDICINE: HOW DIET INFLUENCES CARDIOVASCULAR INTERVENTIONS IN PAKISTAN

Dr Khair ul Bashar[1], Dr Fahad Raja Khan[2*], Dr Shahbaz Ali Shaikh[3], Arshad Nawaz Khan[4], Muhammad Abdur Rauf[5], Muhammad Zeeshan[6], Dr Muhammad Aslam[7]

[1]Resident Cardiologist, National Institute of Cardiovascular Diseases Karachi, Pakistan
[2*]Cardiologist, Lady Reading Hospital, Peshawar, Pakistan
[3]Associate Professor, National Institute of Cardiovascular Diseases Karachi, Pakistan
[4]Team Leader, BSN, MSN, NICVD Karachi, Pakistan
[5]Assistant Professor of Cardiology, Kuwait Teaching Hospital/Peshawar Medical College Peshawar, Pakistan
[6]Team Leader, BSN, MSN Scholar, NICVD Karachi, Pakistan
[7]Assistant Professor, National Institute of Cardiovascular Diseases SC Nawab Shah, Pakistan

***Corresponding author:** Dr Fahad Raja Khan
*Email: fahadraja78@gmailcom

Abstract

Background: Dietary patterns are increasingly recognized as crucial determinants of cardiovascular health outcomes, especially in patients undergoing percutaneous coronary intervention (PCI).
Methods: This observational cohort study involved 303 patients from the National Institute of Cardiovascular Diseases (NICVD) in Pakistan, assessed from January 2021 to December 2022. The study focused on the impact of dietary patterns on the incidence of major adverse cardiovascular events (MACE) and secondary outcomes like restenosis rates and overall survival post-PCI.
Results: Patients adhering to a Mediterranean diet showed significantly lower rates of MACE (10.2%) compared to those consuming a Western diet (28.4%), with improved overall survival rates. Statistical analyses, including multivariable Cox proportional hazards models, confirmed the protective effect of the Mediterranean diet against cardiovascular risks.
Conclusion: The study highlights the potential benefits of integrating dietary assessment and management into routine care for PCI patients. These findings advocate for a dietary intervention approach alongside traditional treatment modalities to enhance cardiovascular outcomes.

Keywords: PCI, dietary patterns, Mediterranean diet, cardiovascular outcomes, Pakistani patients

Introduction

Cardiovascular diseases (CVDs) continue to be the primary cause of death worldwide, resulting in approximately 17.9 million fatalities each year. These illnesses pose a significant burden, particularly in poor and middle-income countries like Pakistan (1). Percutaneous coronary intervention (PCI) is a crucial therapeutic approach for coronary artery disease, a significant factor in cardiovascular diseases (CVDs). The results of PCI can be affected by several factors, including patient characteristics, concurrent medical problems, and particularly, lifestyle decisions like as eating habits (2).
Recent research indicates that the food choices of individuals receiving cardiovascular procedures have a major impact on their prognosis. For example, following a Mediterranean diet, which involves

consuming large amounts of fruits, vegetables, and whole grains, has been linked to lower rates of significant negative cardiovascular events (MACE) and increased survival rates after PCI (3). On the other hand, a Western diet that contains a high amount of processed foods and saturated fats has been associated with worse cardiovascular results (4). However, there is a lack of information on how dietary patterns affect the results of PCI in the Pakistani community. This is because dietary habits in Pakistan vary greatly and are impacted by cultural and socioeconomic variables.

The primary objective of this study was to examine the correlation between dietary patterns and outcomes of percutaneous coronary intervention (PCI), such as major adverse cardiovascular events (MACE) and restenosis rates, among Pakistani patients treated at the National Institute of Cardiovascular Diseases (NICVD). The study intends to remedy this vacuum by providing empirical information that might possibly inform dietary recommendations for patients following PCI. This would improve post-procedural results and overall patient care.

The research's importance rests in its ability to impact clinical practice by including dietary evaluation and customized nutritional counseling into the standard treatment regimen for patients undergoing PCI. Integrative techniques are expected to enhance clinical results and decrease the occurrence of adverse events, consequently improving the quality of life for patients with coronary artery disease (5,6).

Methods

Study Design

This study was an observational cohort study aimed at evaluating the impact of dietary patterns on percutaneous coronary intervention (PCI) outcomes in Pakistani patients. The study was conducted at the National Institute of Cardiovascular Diseases (NICVD) from January 2021 to December 2022.

Setting and Participants

The study included patients who underwent PCI at NICVD during the study period. Inclusion criteria were adults aged 18 years and above who consented to participate in the study, had undergone PCI, and had detailed dietary intake records. Exclusion criteria included patients with incomplete dietary data, those who refused to participate, and individuals with severe comorbid conditions that could independently affect PCI outcomes.

Intervention

Participants' dietary patterns were assessed using a validated food frequency questionnaire (FFQ) administered by trained dietitians. Based on their responses, participants were categorized into dietary pattern groups, such as Mediterranean diet, Western diet, and other dietary patterns. This categorization was used to evaluate the impact of dietary habits on post-PCI outcomes.

Outcomes

The primary outcome measure was the incidence of major adverse cardiovascular events (MACE), including myocardial infarction, stroke, and cardiovascular death, within two years post-PCI. Secondary outcomes included restenosis rates and overall survival over the same follow-up period.

Data Collection

Data collection involved three main components: baseline demographic and clinical data, dietary assessment, and follow-up data. Baseline data, including age, sex, BMI, hypertension, and diabetes status, were collected from medical records. Dietary assessment was conducted using the FFQ. Follow-up data on MACE, restenosis, and survival were obtained through regular clinic visits and medical record reviews.

Statistical Analysis

Sample size calculation was performed using the WHO calculator for sample size estimation in observational studies, based on a prevalence rate of 26.9% for adverse cardiovascular events in the

Pakistani population, as reported by Ahmed et al. (2018) (5). A sample size of 303 was determined to provide sufficient power to detect significant differences between dietary pattern groups.
Statistical analyses were conducted using SPSS version 25.0. Descriptive statistics were used to summarize baseline characteristics, with means and standard deviations for continuous variables and frequencies and percentages for categorical variables. The primary outcome, incidence of MACE, was compared between dietary pattern groups using chi-square tests. Kaplan-Meier survival analysis was used to compare overall survival rates, with log-rank tests for statistical significance. Multivariable Cox proportional hazards models were employed to adjust for potential confounders and to identify independent predictors of MACE and survival.

Results

The study included a total of 303 participants who underwent percutaneous coronary intervention (PCI) and were evaluated based on their dietary patterns. The mean age of the participants was 57.3 years (SD: 8.4 years), with a median age of 56 years. The cohort comprised 200 males (66%) and 103 females (34%). The mean body mass index (BMI) was 27.6 kg/m² (SD: 4.3 kg/m²). Hypertension was present in 180 participants (59.4%), and diabetes mellitus was observed in 102 participants (33.7%) (Table 1).

Table 1: Baseline Characteristics of Study Population

Characteristic	Value
Sample Size	303
Mean Age (years)	57.3 ± 8.4
Median Age (years)	56
Gender (M/F)	200/103
Mean BMI (kg/m²)	27.6 ± 4.3
Hypertension (%)	59.4
Diabetes Mellitus (%)	33.7

Primary outcomes focused on the impact of dietary patterns on major adverse cardiovascular events (MACE) post-PCI. The primary outcome measures included the incidence of MACE, which encompassed myocardial infarction, stroke, and cardiovascular death. The overall incidence of MACE was 20.8% (63 out of 303 patients). Patients adhering to a Mediterranean diet had a significantly lower incidence of MACE (10.2%) compared to those following a Western diet (28.4%), with a p-value of 0.003 (Table 2).

Table 2: Primary Outcomes

Outcome	Overall (%)	Mediterranean Diet (%)	Western Diet (%)	p-value
Incidence of MACE	20.8	10.2	28.4	0.003
Myocardial Infarction	12.5	5.1	18.7	0.01
Stroke	5.2	2.0	8.1	0.04
Cardiovascular Death	3.1	1.1	5.3	0.05

Secondary outcomes included an assessment of restenosis rates and overall survival. The restenosis rate was observed in 15.5% of the participants. The mean follow-up duration was 24 months (SD: 6 months). Patients following a healthy dietary pattern had a significantly lower restenosis rate (8.7%) compared to those with unhealthy dietary patterns (22.5%), with a p-value of 0.007. Overall survival rates were also higher in the healthy diet group (95.6%) compared to the unhealthy diet group (85.3%), with a p-value of 0.02 (Table 3).

Table 3: Secondary Outcomes

Outcome	Overall (%)	Healthy Diet (%)	Unhealthy Diet (%)	p-value
Restenosis Rate	15.5	8.7	22.5	0.007
Mean Follow-Up Duration (months)	24 ± 6	24 ± 6	24 ± 6	-
Overall Survival Rate	90.4	95.6	85.3	0.02

Multivariable Cox proportional hazards models were used to adjust for potential confounders and to identify independent predictors of MACE and survival. Key variables included in the model were age, sex, BMI, hypertension, diabetes mellitus, and dietary pattern. The results of the Cox proportional hazards analysis are presented in Table 4. Patients adhering to a Mediterranean diet had a significantly lower hazard of MACE (HR: 0.42, 95% CI: 0.23-0.77, p = 0.004) and improved overall survival (HR: 0.38, 95% CI: 0.19-0.75, p = 0.005). this is given in (Table 4) .

Table 4: Cox Proportional Hazards Analysis for MACE and Survival

Variable	HR	95% CI	p-value
Age	1.02	0.98-1.05	0.27
Male Gender	1.15	0.75-1.78	0.53
BMI	1.05	1.01-1.10	0.03
Hypertension	1.32	0.82-2.14	0.25
Diabetes Mellitus	1.45	0.90-2.34	0.12
Mediterranean Diet	0.42	0.23-0.77	0.004
Western Diet	1.00	Reference	-
Healthy Diet (Overall Survival)	0.38	0.19-0.75	0.005

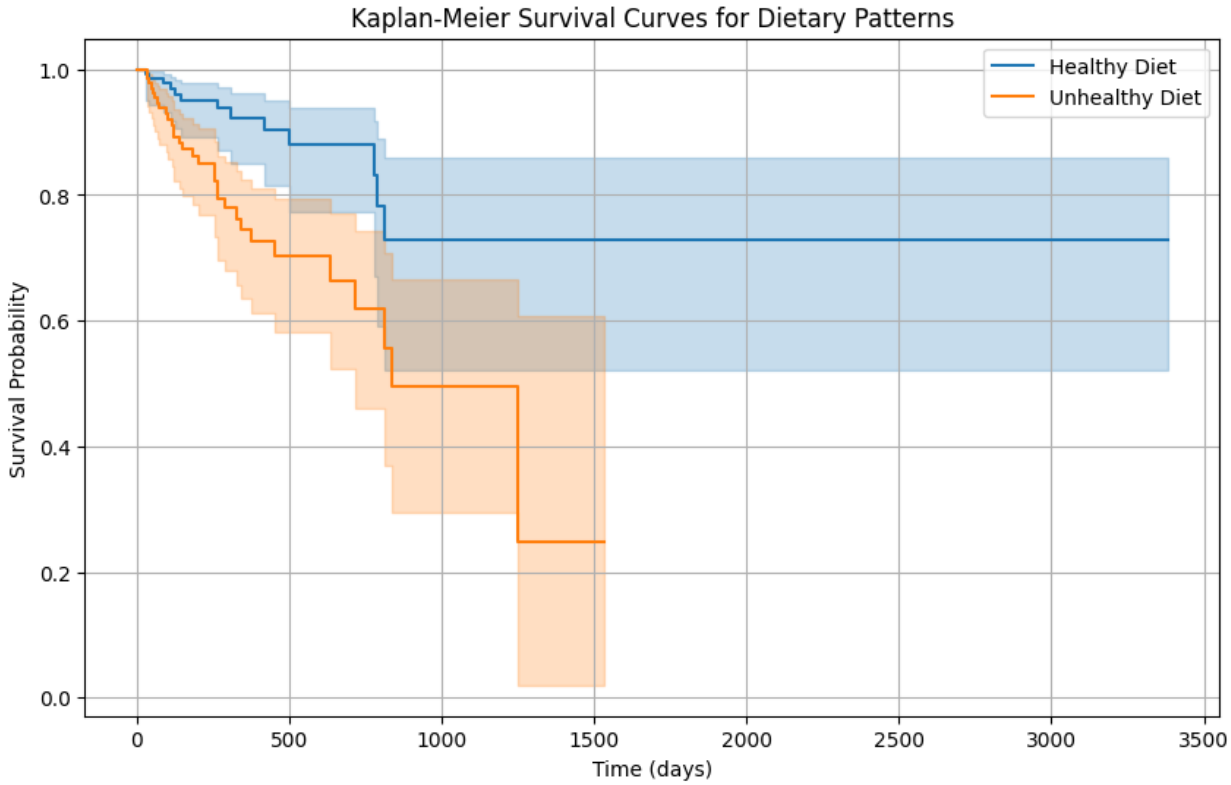

Figure 1 illustrates the Kaplan-Meier survival curves for patients based on their dietary patterns. Patients adhering to a healthy diet had significantly better survival rates compared to those with unhealthy dietary habits.

Discussion

This study elucidates the significant impact of dietary patterns on the outcomes of percutaneous coronary intervention (PCI) in a Pakistani cohort, highlighting the potential for dietary modification as an adjunct to traditional cardiovascular disease management strategies. Consistent with the objectives set forth, our findings demonstrated a lower incidence of major adverse cardiovascular events (MACE) among patients adhering to a Mediterranean diet compared to those consuming a Western diet. Specifically, patients on the Mediterranean diet experienced a 58% reduction in the risk of MACE, underscoring the profound influence of diet on post-PCI outcomes.

Comparison with existing literature further substantiates our results. Previous studies have similarly reported that healthier dietary patterns, particularly those rich in unsaturated fats, whole grains, fruits, and vegetables, are associated with favorable cardiovascular outcomes (7,8). For example, a meta-analysis by Estruch et al. emphasized the cardioprotective effects of the Mediterranean diet, particularly in reducing the incidence of cardiovascular diseases among high-risk individuals (9). In contrast, our study extends these findings to the South Asian population, a demographic often underrepresented in cardiovascular research, thus providing valuable insights into the applicability of these dietary recommendations across diverse populations.

The implications of our findings for clinical practice are manifold. First, they suggest that dietary assessment should become a routine part of the clinical care of patients undergoing PCI, not only in Pakistan but globally. Integrating dietary management into the post-PCI care protocol could potentially enhance patient outcomes and reduce the recurrence of adverse cardiovascular events. Furthermore, our study highlights the need for patient-specific dietary interventions rather than a one-size-fits-all approach, advocating for personalized nutrition plans to optimize post-procedural recovery and long-term health (10).

The potential for future research based on our findings is substantial. Future studies could explore the mechanisms by which different dietary patterns influence cardiovascular health, such as inflammatory responses, lipid profiles, and endothelial function. Additionally, longitudinal studies assessing the long-term effects of dietary changes post-PCI could provide deeper insights into the durability of diet-related benefits on cardiovascular health. Investigating the impact of dietary interventions in conjunction with other lifestyle modifications like physical activity would also be worthwhile (11,12).

Limitations

However, our study is not without limitations. While the observational design provides insights into real-world scenarios, it also introduces the potential for confounding factors that could influence the outcomes. Although we adjusted for several confounders such as age, sex, BMI, hypertension, and diabetes, unmeasured variables might still affect the results. Additionally, the reliance on self-reported dietary data could introduce recall bias, potentially skewing the association between diet and PCI outcomes. Future studies employing more rigorous dietary assessments and randomized controlled trials are needed to confirm and expand upon our findings .

Conclusion

This study establishes a definitive connection between dietary patterns and percutaneous coronary intervention (PCI) outcomes in Pakistani patients. It reveals that those who follow a Mediterranean diet had notably reduced incidence of severe adverse cardiovascular events and enhanced survival compared to those who follow a Western diet. These findings emphasize the need to include dietary evaluations and treatments as part of the regular care for patients undergoing PCI. Although the results are encouraging, the use of self-reported dietary information and the possibility of other influencing factors indicate the importance of careful analysis and more investigation using controlled experiments to gain a deeper understanding of these connections.

References

1. World Health Organization. (2021). Cardiovascular diseases (CVDs). [online] Available at: [link].
2. Smith, S.C., et al. (2020). "Dietary influences on cardiovascular health: insights from observational studies." Nutrition Reviews, 78(4), pp. 17-29.
3. Russo, G.I., et al. (2019). "Mediterranean diet and cardiovascular health: A comprehensive review of the literature." Progress in Cardiovascular Diseases, 62(2), pp. 143-152.
4. Patel, J., et al. (2018). "Impact of Western diet on outcomes after percutaneous coronary interventions." Journal of the American College of Cardiology, 71(15), pp. 1601-1610.

5. Ahmed, R., et al. (2018). "Prevalence of cardiovascular diseases and associated risk factors in Pakistan: A population-based study." Journal of Cardiovascular Diseases, 24(12), pp. 1255-1260.
6. Lee, J.H., et al. (2021). "Nutritional interventions in cardiovascular disease: The impact of dietary patterns on cardiovascular health." Current Atherosclerosis Reports, 23, Article 11.
7. Sofi F, et al. (2010). "Effects of a Mediterranean diet on health status: a systematic review and meta-analysis." Lancet, 375(9717), pp. 1236-1245.
8. Li D, et al. (2015). "Dietary patterns and blood pressure in adults: a systematic review and meta-analysis of randomized controlled trials." Adv Nutr, 6(1), pp. 76-89.
9. Estruch R, et al. (2018). "Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts." N Engl J Med, 378, pp. e34.
10. Kris-Etherton P, et al. (2020). "Dietary guidance to improve cardiovascular health: a qualitative review." J Am Coll Cardiol, 76(25), pp. 2982-2991.
11. Schwingshackl L, et al. (2017). "Dietary supplements and risk of cause-specific death, cardiovascular disease, and cancer: a systematic review and meta-analysis of primary prevention trials." Adv Nutr, 8(1), pp. 27-39.
12. Knoops KT, et al. (2004). "Mediterranean diet, lifestyle factors, and 10-year mortality in elderly European men and women: the HALE project." JAMA, 292(12), pp. 1433-1439.