Frontiers in Health InformaticsISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 4
Open Access

A Study on Omega-3 Fish Oil Safety and Efficacy for Cardiac Patients

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Cite this paper as:
Anurag Rawat, Akshita Khare, Nitin Govindprabhu Suradkar, Chadive Dhanunjaya Kumar and Harshitha U Rajmohan (2024). A Study on Omega-3 Fish Oil Safety and Efficacy for Cardiac Patients. *Frontiers in Health Informatics,* 13(4), 826-837.

ABSTRACT

Aim & Objectives*: The research aims to highlight the efficacy and safety of omega-3 fatty acids for cardiac patients.*

Background*: There has been a growing controversy regarding the role of omega-3 fatty acids in case reducing cardiac diseases. Some research believes that polyunsaturated omega-3 fatty acids do not play an active role in addressing cardiac complications. However, physicians still recommend omega-3 fatty acid consumption for the prevention of cardiac complications. The present research has been conducted to address this dilemma and to come to a final complication regarding the stance of omega-3 fatty acids about cardiac disease occurrence.*

Method*: The proposed research is based on systematic and qualitative data analytics interpreted on grounded theory axial coding and thematic analysis techniques. The method included a collection of 21 research papers relevant to the scope of the research. The research papers have been thoroughly interpreted and based on grounded theory axial coding and thematic analysis techniques have been applied to analyse the collected qualitative data.*

Result*: Existing investigations highlighted effects of omega 3 PUFA for cardiac health. Present study explores significant effect of omega 3 PUFA for patients with major cardiac complications. The previous research papers have highlighted that omega 3 PUFA especially help reduce risk to cardiac health in an individual. Contrastingly researchers have also identified that in the case of patients with cardiac complications omega 3 PUFA does not have any effect in improving the condition.*

Conclusion*: Omega 3 PUFA is preventive in action but it cannot reverse cardiac damage. It is recommended by physicians to consume 250mg/day of omega-3 PUFA to improve heart health.*

Keywords: *Omega-3 fatty acids**,** Omega 3 PUFA **,** Cardiac disease, Polyunsaturated omega-3, EPA+DHA**,** Triglycerides.*

INTRODUCTION AND BACKGROUND

Omega-3 fatty acids are found in fish oil and can be considered safe and effective for cardiac patients. Omega-3 has a minimal adverse effect and is well tolerated, making it safe for cardiac patients to use (Nicholls et al.

2020). However, fish oil supplements must be taken with a doctor's approval if an individual has any chronic condition or takes other medicines. Omega-3 can interact with other supplements and medications, especially blood thinners which is why the approval of doctors is important. According to Khan et al. (2021), taking Omega-3 with a doctor's advice can help in preventing cardiovascular diseases and treating such illnesses. It can help treat stroke, coronary heart disease (CHD), myocardial infarction (MI), and the respective.

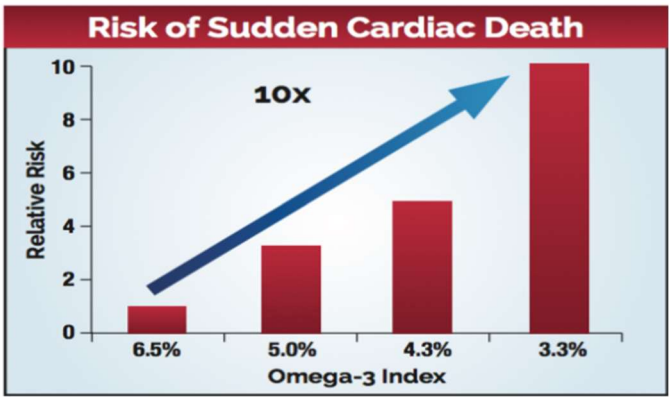

Figure 1: Omega-3 index (OYMN, 2024)

Figure 1 shows the benefits of knowing the Omega-3 index for a cardiac patient to monitor brain and heart health. The graphical presentation shows that the lifespan potential of a cardiac patient increases by 4.6% with an Omega-3 index than those who have a lower level (OYMN, 2024). The risk of a sudden cardiac arrest or death is 10-fold higher in a person having a lower Omega-3 level. The Omega-3 level of an individual can be known by running specific tests to ensure the right amount of supplements.

Rationale

The growing controversy regarding the role of Omega-3 fatty acids in reducing cardiac diseases has been addressed in the current research. The research by Gonçalinho et al. (2021) has found that cardiac complications cannot be directly decreased by using Omega-3 medications. It can only be consumed with appropriate advice from doctors to patients based on their heart health for further cardiovascular protection. Omega-3 supplements are observed to be safe and a powerful voice of EPA+DHA. However, as argued by Nicholls et al. (2020), the consumption of Omega-3 fish oil supplements is believed to cure the risk of sudden cardiac death (SCD) as it decreases triglycerides and arrhythmia and slightly lowers blood pressure. As a result, the current research focuses on the overall impact of Omega-3 fish oil by discussing its benefits and side effects on cardiac patients.

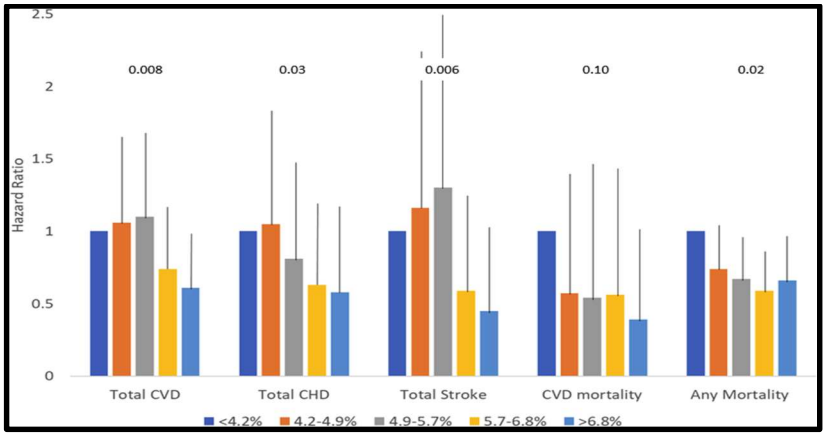

Figure 2: Relationship between quintiles of Omega-3 index and hazard ratio

(Influenced by Senftleber et al. 2020)

Figure 2 projects the relationship between the Omega-3 index and hazard ratio for death from CVD, cancer, and other causes. It has been projected that the survey among 2500 participants has provided the idea that the Omega-3 index is significantly yet inversely associated with total CVD (Senftleber et al. 2020). Besides, Omega-3 risk categories have also been tested in this survey showing that the usage of modified Omega-3 does not change the result.

PREVIOUS STUDIES

Benefits of Omega-3 Fish Oil Supplements for Cardiac Patients

Omega-3 fish oil supplements are regarded to help reduce the risks of coronary diseases. As stated by Sherratt et al. (2023), the risks of CVD can be minimized by using Omega-3 fish oil as it helps in reducing triglyceride levels which further lowers the high chances of heart diseases, atherosclerosis, and stroke. Additionally, HDL cholesterol is good for health which is increased by Omega-3s and helps in lowering blood pressure as well. Similarly, Elagizi et al. (2021) have shared by saying that cardiovascular mortality can be reduced by 93% with the association of Omega-3 supplements. Therefore, qualified heart claims support using such supplements for cardiac patients.

The meta-analysis by Weinberg et al. (2021) has found that non-fatal myocardial infarction can be reduced by 87% with the help of Omega-3 supplements. It can also be observed that existing coronary heart diseases and cardiac conditions can be supported by using prescribed Omega-3 fatty acids. It lowers the chances of CVD at a significant level which requires further dietary correction and supplements to achieve the maximum outcome. FDA recommends dietary supplements must not exceed 2 grams of DHA and EPA per day for cardiac patients (Samuel & Nattel, 2021). In this way, Omega-3 provides potential benefits to treat cardiac patients by reducing the risks of cardiovascular events.

Initial Risk Reduction of Heart Diseases with Omega-3 Supplements

Some of the cardiovascular events can be avoided by using supplements of Omega-3 fatty acids. Evidence by Santos et al. (2023) has depicted that existing coronary heart diseases and severe conditions can be treated by Omega-3 supplements. Moreover, 1000 mg of Omega-3 dose per day is found to be appropriate as specified by the FDA along with the following dietary supplements. A daily intake of 2 g EPA and DHA has also been recommended by FDA followed by other considerations for a better result. Similarly, Gonçalinho et al. (2021) have also suggested that patients with heart disease might have diabetes mellitus or pre-diabetes that can also be addressed with the right dose of Omega-3 fish oil. Consequently, the heart conditions and the side effects of Omega-3 fatty acids must be evaluated in different patients before using such medications.

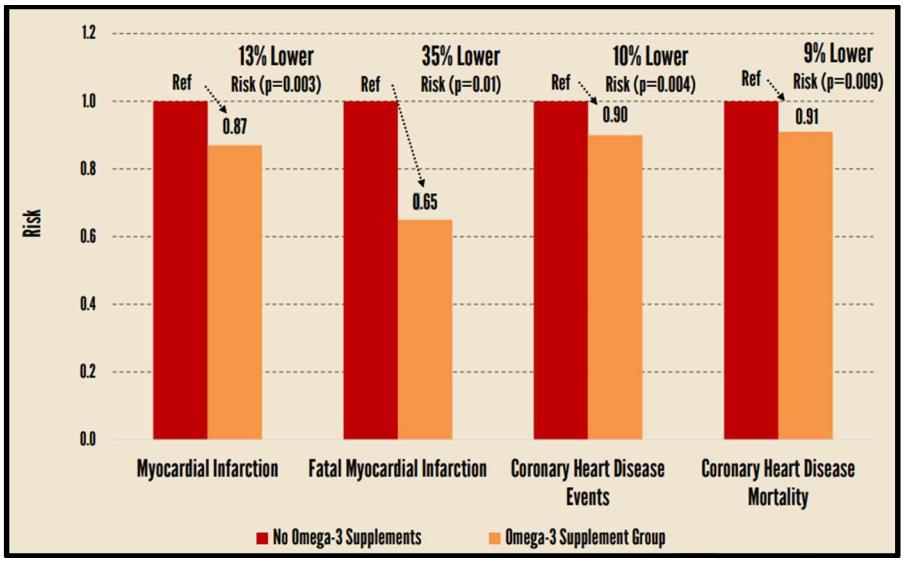

Figure 3: Effect of Omega-3 supplementation on CVD risks (Grassroots Health, 2020)

Figure 3 is the presentation of the impact of Omega-3 supplements on controlling CVD risks. It has been found that the chances of myocardial infarction can be reduced by 13% coupled with events of coronary heart diseases by 10% with proper medications of Omega-3 (Grassroots Health, 2020). However, it is yet to be tested to reduce CVD events while the Omega-3 supplements are being taken alone. There is also a chance of developing inflammation due to the side effects of Omega-3 fish oil supplements that must be considered before their consumption.

RESEARCH AIM AND OBJECTIVES

Aim

The study aims to critically examine the efficacy and safety of Omega-3 fish oil for cardiac patients.

Objectives

The objectives of the research paper have been mentioned below.

To critically analyze the efficacy and safety of Omega-3 fatty acids for cardiac patients

To determine the benefits of Omega-3 PUFA on cardiac patients

To identify the side effects of Omega-3 fish oil leading to complications for cardiac patients

To assess the Omega-3 fish oil treatments for cardiac patients

RESEARCH METHOD

A secondary qualitative method has been selected to conduct this research which has collected existing evidence on the topic. Relevant journals and articles have been collected by using several tools to obtain analytical perspectives (Sherratt et al. 2023). Besides, a systematic review process has been acknowledged for the data collection and data analysis process of this research paper. The chosen databases are PubMed, Scopus, ProQuest, and NIH as they provide authentic peer-reviewed journals and articles on medicinal topics.

BOOLEAN SEARCH STRATEGY

Table 1: Boolean search operator (Influenced by Martins et al. 2023)

Keywords	AND/OR	Keywords	AND/OR	Keywords	Search results	Selected articles
Omega-3 fish oil	AND	Cardiac patients	OR	Fish oil supplement	Scopus= 16 ProQuest= 42 NIH= 23	6
Cardiovascular disease	AND	Omega-3 efficacy	OR	Myocardial infarction	PubMed= 11 ProQuest= 28 Scopus= 12	8
Sudden cardiac arrest	OR	Omega-3 fish oil consumption	AND	FDA Recommendations	Scopus= 38 ProQuest= 21 PubMed=55	7

Table 1 is the Boolean search results which mention the keywords that have been used to find relevant journals and articles from the databases.

Inclusion and exclusion criteria

Table 2: Inclusion and exclusion criteria (Influenced by Abbasi et al. 2022)

Inclusion and exclusion criteria	Inclusion	Exclusion
Date	Articles published between 2019 to 2024	Articles published before 2018
Geography	Global regions have been included	No such geographical areas have been excluded

Setting	Publications on the efficacy and safety of using Omega-3 fish oil for cardiac patients	Journals and articles that do not include information on the impact of Omega-3 supplements on cardiac patients
Study design or method	Articles on qualitative, qualitative, meta-analysis, cross-sectional, and the respective	Articles that do not include the mentioned study methods
Publication Type	Published research papers accessed from only credible and reliable sources	Published articles that are not credible and authentic or doctoral articles
Language	English language	Other than the English language

Table 2 mentions the inclusion and exclusion criteria for selecting peer-reviewed publications from credible sources.

PRISMA

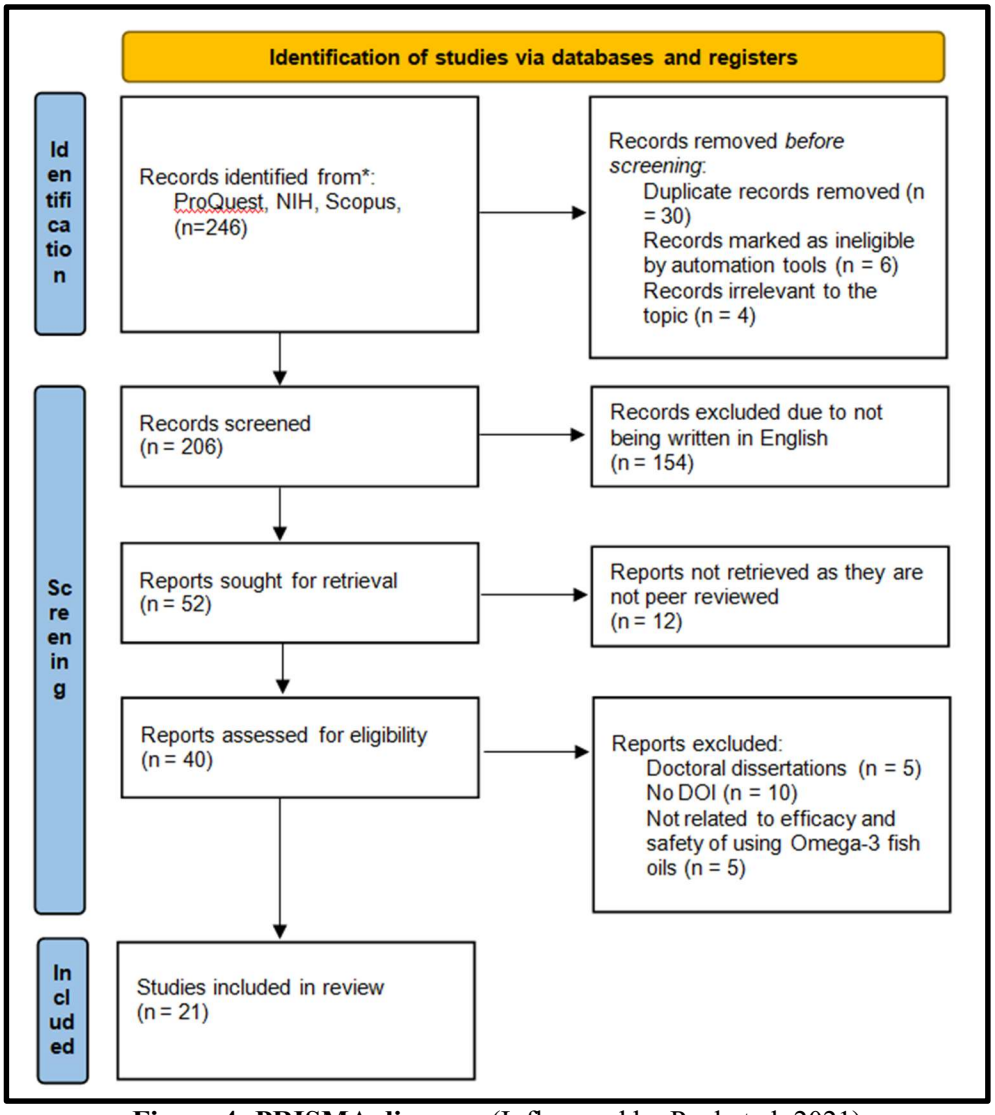

Figure 4: PRISMA diagram (Influenced by Paul et al. 2021)

Figure 4 demonstrates the PRISMA diagram that has worked as a screening module to select 21 peer-reviewed journals and articles after filtering them.

The tools used in the data collection process have shown that the selection of the qualitative method has worked appropriately as per the study's nature. Axial coding and thematic analysis have been included in the data analysis process to critically demonstrate the safety of using Omega-3 medications for reducing cardiac complications (Paul et al. 2021). The data analysis by using grounded theories and thematic analysis works effectively for such critical analysis.

RESULTS

Table 3: Axial Coding

Authors	Codes	Themes
Senftleber et al. (2020) Shen et al. (2022) Fernandez et al. (2021) Innes & Calder (2020) Kalstad et al. (2021)	Heart health, Omega-3 supplement consumption, myocardial efficiency	"Theme 1: The overall heart health of cardiac patients can be improved by consuming Omega-3 supplements"
Ruscica et al. (2022) Sherratt et al. (2023) Mason et al. (2020) Golanski et al. (2021) Rodriguez et al. (2022)	Omega-3 PUFA, cardiac patients, plaque build-up	"Theme 2: Omega-3 PUFA helps in decreasing CVD events among cardiac patients"
Reiner et al. (2024) O'Keefe et al. (2024) Baumgartner et al. (2023) Quispe et al. (2022)	Atrial fibrillation, blood sugar changes, acid reflux	"Theme 3: Atrial fibrillation and bleeding can be seen as side effects of consuming Omega-3 supplements"
Mason et al. (2023) Watanabe & Tatsuno, (2020) Ward et al. (2020) Wu et al. (2021) Tadic et al. (2021) Khoukaz & Fay (2021)	Coronary diseases, fish oil supplements, risk of CVD events	"Theme 4: Coronary artery diseases can be prevented by using Omega-3 fish oil supplements"

DATA ANALYSIS

Thematic analysis

Theme 1: The overall heart health of cardiac patients can be improved by consuming Omega-3 supplements

The positive impact of Omega-3 fish oil is evident in reducing sudden death caused by cardiac arrest. According to Shen et al. (2022), cardiac arrhythmia can cause a high mortality rate among patients which is generally known as coronary heart disease. Hyperlipidemia can be treated by using Omega-3 medications and hypertension that helps in controlling blood pressure (Innes & Calder 2020; Kalstad et al. 2021). Moreover, there is no specific drug interaction with the usage of Omega-3 fatty acids that makes it safe to use for cardiac patients. However, as argued by Fernandez et al. (2021), trials have shown that long-term consumption of Omega-3 fatty acids has demonstrated only cardio-protective effects. As a result, on-treatment EPA levels are strongly correlated in terms of Omega-3 fish oil supplements.

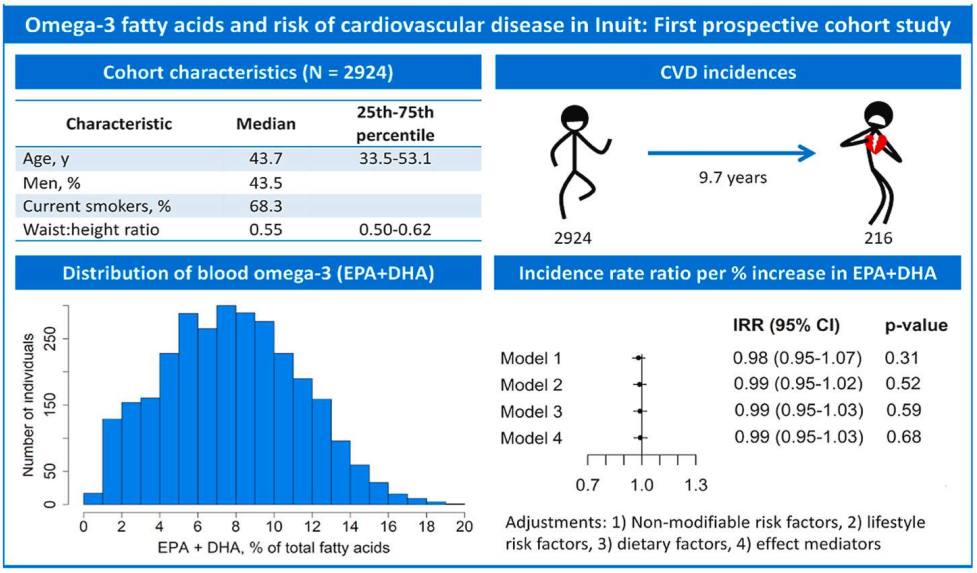

Figure 5: Results of a cohort study on the effect of Omega-3 on the risks of cardiovascular disease (Influenced by Senftleber et al. 2020)

Figure 5 presents the cohort study results produced by Senftleber et al. (2020) regarding the impact of Omega-3 supplements on reducing risks of CVD events. It has been observed that the majority of the participants having such incidents are of the age between 43-44 years. The number of participants is approximately 260 who have total fatty acids by over 10%. CVD incidences have generally taken place between 9.7 years for around 216 patients who participated in this cohort study.

Theme 2: Omega-3 PUFA helps in decreasing CVD events among cardiac patients

Evidence by Ruscica et al. (2022) has shown that prolonged consumption of Omega-3 fatty acids and PUFAs from fish or supplements can create a positive effect on heart health. It contributes toward a lower risk of CVD along with following an appropriate dietary plan to further improve the heart health of an individual (Sherratt et al. 2023). Furthermore, servings of fatty fish at least twice a week can also be helpful for cardiac patients as it produces Omega-3 which can organically reduce the risks of cardiac issue development (Mason et al. 2020). Consequently, Omega-3 PUFAs help in reducing systemic vascular resistance, and myocardial efficiency can also be improved.

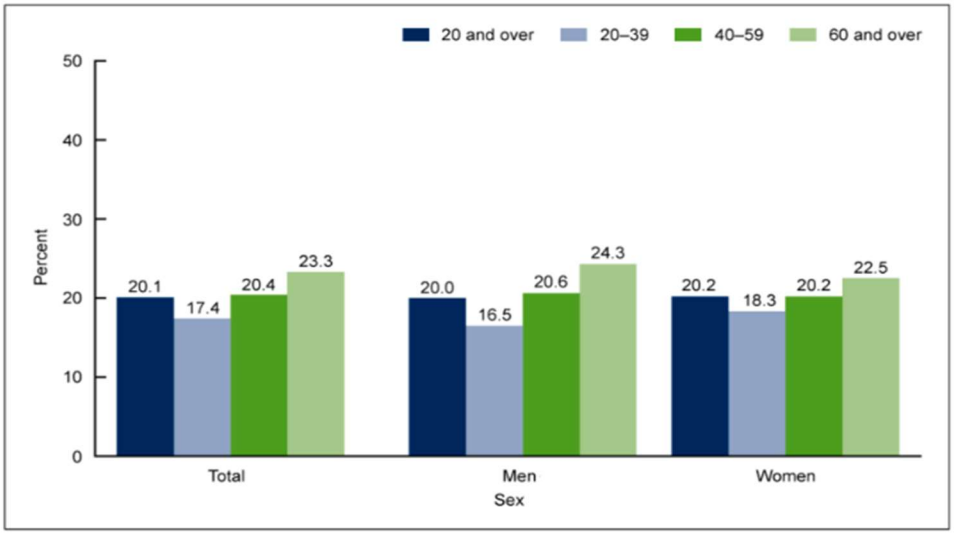

Figure 6: Consumption of sea-food among adults aged 20 and above (Influenced by Rodriguez et al. 2022)

Figure 6 presents the survey results by Rodriguez et al. (2022) regarding the consumption of seafood among adults of 20 years or above. It has been observed that the consumption is high above the age of 40 years. 20.4% of men and women aged between 40-59 and 23.3% of men and women aged 60 years and above consume seafood. Similarly, Golanski et al. (2021) have noted that the organic consumption of seafood is comparatively prolonged than taking Omega-3 supplements. Therefore, it can create a more effective impact on the overall heart health of cardiac patients. Omega-3 PUFAs help improve the efficacy of the left ventricular diastolic filling which reduces the higher chances of reducing CVD incidents.

Theme 3: Atrial fibrillation and bleeding can be seen as side effects of consuming Omega-3 supplements

It is evident that consuming Omega-3 can increase the chance of developing the risks of atrial fibrillation and bleeding. As stated by Albert et al. (2021), regular consumption of fish oil supplements can increase the chance of atrial fibrillation by 13%. CVD patients can also develop such diseases with regular consumption of fish oil or Omega-3 which can lead to other side effects as well. It can cause headaches and gastrointestinal symptoms which require advice from doctors to lower the risks (Reiner et al. 2024). Besides, atrial fibrillation can further be increased among cardiac patients who consume more than 1 gram of Omega-3 per day. As a result, Omega-3 supplements can elevate the risk of atrial fibrillation which must be considered by doctors as well.

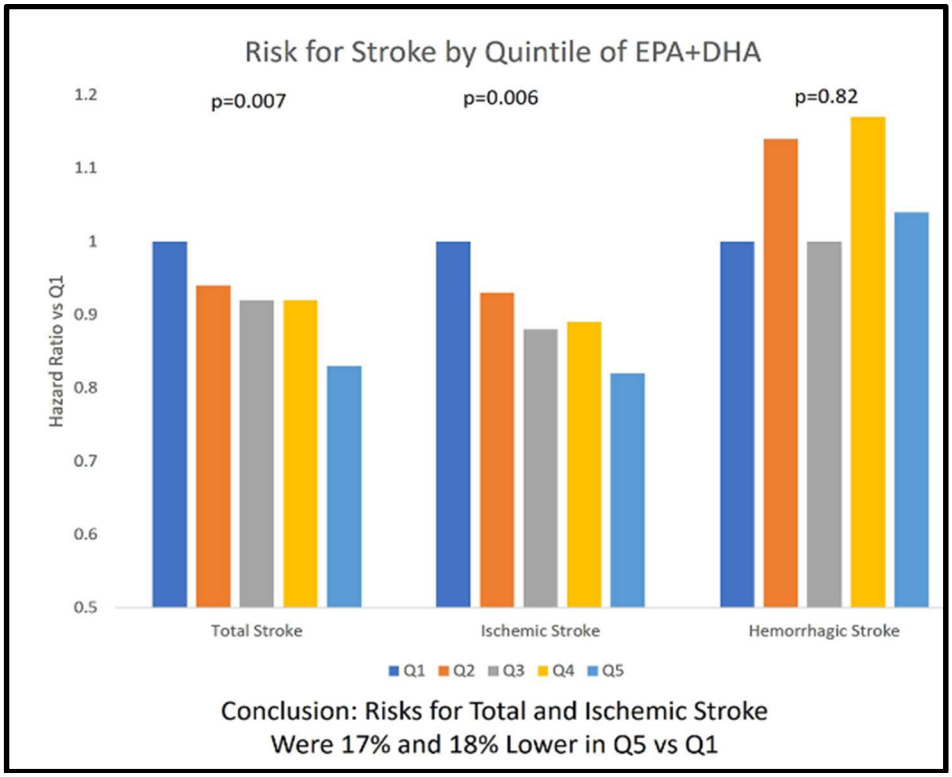

Figure 7: Association of Omega-3 levels and stroke risk (Influenced by O'Keefe et al. 2024)

Figure 7 is the projection of the association between stroke risks and the Omega-3 levels. The hazard ratio has been estimated and observed from Q1 to Q5 where the risk of developing total and Ischemic stroke was 17% and 18% respectively (O'Keefe et al. 2024). However, it was significantly lower in Q5 than Q1 which has been measured by acknowledging the risk of stroke by Quintile of EPA+DHA. The results have also shown that regular consumption of Omega-3 can lead to hemorrhagic stroke which can also be considered as one of its side effects (Baumgartner et al. 2023). Additionally, Quispe et al. (2022) have also depicted that the chances of bleeding can also increase among cardiac patients as Omega-3 can interact with anticoagulants or such medications.

Theme 4: Coronary artery diseases can be prevented by using Omega-3 fish oil supplements

Coronary heart diseases can be prevented by using Omega-3 medications as it is an important form of fat. Omega-3 and Omega-6 are essential for the human body and can also initiate to creation of a healthy body (Mason et al. 2023; Watanabe & Tatsuno, 2020). Omega-3 is believed to cure coronary diseases slowly yet in an effective way along with maintaining a healthy diet for heart diseases. In addition, artery diseases are mainly the cause of atherosclerosis which is a long-term process of fatty deposits as they build up on the coronary arteries. However, as argued by Ward et al. (2020), CHD generally causes cardiac arrest, heart attack, angina, or chest pain which can be temporarily slowed down by consuming Omega-3 for a prolonged time. Consequently, triglyceride levels can be maintained for cardiac a patient who prevents coronary diseases.

On another note, evidence has found that Omega-3 alone cannot prevent artery diseases where physical activities and healthy diets play a significant role. Calories from Omega-3 and Omega-6 fatty acids can provide a healthy diet for cardiac patients (Wu et al. 2021; Tadic et al. 2021). Moreover, there are marine Omega-3s such as EPA and DHA which can be found in fatty fish. CHD can be lowered by consuming Omega-3 as it lowers the risk of abnormal heart rhythm which can cause sudden heart attack and death. It also helps in lowering triglyceride levels and the growth rate of plaque can also be reduced which clogs blood vessels (Khoukaz & Fay, 2021). Hence, Omega-3 supports lowering high blood pressure and prevents inflammation of blood vessels from forming further blood clots.

DISCUSSION

The critical discussion of the study has found that Omega-3 can reduce the risks of developing CVD events. Omega-3 PUFA can help decrease the risk of heart disease when substituted with saturated fats (Raad et al. 2021). Moreover, it assists in lowering triglycerides in blood and overall blood pressure by reducing joint inflammation in rheumatoid diseases. It further helps in controlling depression, anxiety, dementia, migraine, and diabetes and reduces the chance of developing coronary diseases (Cornish et al. 2022). Contrarily, bleeding and atrial fibrillation are the main side effects of consuming Omega-3 supplements among cardiac patients (Madison et al. 2021). Besides, heartburn, nausea, diarrhoea, and gastrointestinal symptoms can also be seen as side effects of such supplements. As a result, the research covers the areas of Omega-3 medications that are essential to be known for prescribing them for cardiac patients.

CONCLUSION

The study's critical analysis has depicted evidence of the safety and efficacy of Omega-3 fish oil being used as a medication for cardiac patients. Evidence has shown that various CVD events could be controlled by consuming Omega-3 fish oil supplements. Besides, it is particularly helpful for patients who have existing CVD events or show any symptoms related to it. A systematic review has been conducted with thematic analysis to focus on exploring the benefits of Omega-3 PUFA to prevent coronary artery diseases as well. In this way, a critical exploration of Omega-3 fish oil and the safety of using it for cardiac patients have been demonstrated in this research.

FUTURE SCOPE

The current research has a future scope as it has addressed and explored a crucial medical case of cardiac patients. The consumption and impact of Omega-3 fish oil supplements are increasing and proper information about their safety and efficiency needs to be considered (Hernandez et al. 2022). Hence, future studies can further focus on specific CVD events that can be cured or prevented by prescribing Omega-3 fatty acids.

LIMITATION

Despite the effective knowledge about Omega-3 fish oil and the discussion on its safety for cardiac patients, the research lacks some information. The discussion fails to identify and elaborate on the side effects that Omega-3 fish oil can create on cardiac patients. It can spread awareness and the necessity of acquiring knowledge of using such supplements for cardiac patients as well.

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