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A Critical Review of the effect of Omega-3 Poly-Unsaturated Fatty Acids (PUFAs) on Coronary Heart Disease (CHD) and CHD Mortality

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Abstract **- This study is a critical review to ascertain whether Omega-3 (Poly Unsaturated Fatty Acids) PUFAs can help reduce the risk of Coronary Heart disease (CHD) and (CHD) mortality. Omega-3 PUFAs (Poly Unsaturated Fatty Acids) are supplements regularly recommended globally to equalise essential body nutrients and to maintain or improve health. The review captured Mediterranean diets, fatty fish and heart disease, Omega-3 supplements, Clinical Evidence, Positive Clinical Studies, Negative Clinical Outcomes, Net Benefit of Clinical Evidence, the evaluation of the advantages Omega-3 PUFAs on CVD risk factors, especially on CHD and the explanation of the differences in clinical studies. The omega-supplements was found to have been used for different medical problems such as pulmonary, psychiatric, dermatologic, gastrointestinal, renal, rheumatic, and metabolic conditions, they have also commonly been used to prevent or reduce both primary and secondary cardiovascular diseases, particularly coronary heart disease. Many epidemiological studies, as well as extensive randomised clinical (RCTs), indicate that average dosage omega-3 PUFAs substantially minimise the dangers of coronary artery disease (CHD). Based on scientific evidence, it was recommended that patients with CHD, those with or at risk of CHD should take the right dose of omega-3 PUFAs. Much higher doses are required to decrease triglyceride levels. Nonetheless, recent RCTs raise questions about the function of omega-3 PUFAs in CHD treatment. The review also analysed the RCTs and systematic evidence of omega-3 PUFAs to have a clear understanding of the present role of omega-3 PUFAs in reducing or preventing the risk of CHD and CHD mortality.**

Keywords: Omega-3 PUFAs, Coronary Heart Disease (CHD), CHD Mortality, Omega-3 Supplements.

Introduction

Omega-3 Poly Unsaturated Fatty Acids are among the frequently prescribed supplementation with an incredible market globally. They are defined as a group of polyunsaturated fatty acids characterised by multiple bonds (Arca et al. 2017, p. 97; Eckel et al. 2017, p. 24). The main types of long chain omega-3 fatty acids comprises of docosa hexaenoic acid (DHA) and eicosapentaenoic acid (EPA) (Bird, Calder, and Eggersdorfer 2018, p. 102; D'ascoli et al. 2016, p. 970). It is worth noting that both DHA and EPA are gotten from the consumption of seafood such as fishes, fish oils, egg and dairy products.

Coronary heart disease (CHD) on the other hand, also known as ischemic heart disease (IHD) is a condition caused by a waxy substance known as plaque, which builds up inside the coronary arteries over a long time, resulting to a disease condition called atherosclerosis (Li et al. 2017, p. 578). Coronary mortality is defined as the death, which can/is being attributed to CHD (Paoli et al. 2015, p. 1000). Treating people with or at risk of CHD with omega-3 PUFAs derived from seafood to enhance cardiac results, is backed by substantial clinical RCTs. The approach by which omega-3 PUFAs are used to boost cardiac outcomes is thought to be as a result of their anti-inflammatory, anti-thrombotic, anti-platelet, and their conducive impacts on arrhythmias, hypertriglyceridemia and other endothelial function and atherogenic lipoproteins (Weylandt et al. 2015, p. 154; Maki et al. 2017, p. 1153).

The current instructions from the British Heart Foundation propose a daily 1g of DHA and EPA dosage for individuals after myocardial infarction (MI) (Sacks et al. 2017, p. 3; Veenstra et al. 2017, p. 900). To decrease levels of triglyceride, higher dosages are required, and British Heart Foundation endorses a dosage between 2g and 4g of DHA and EPA on a daily basis (Calder 2015, p. 19; Zendedel et al. 2015, p. 201; Colussi et al. 2017, p. 193). To achieve the recommended omega-3 PUFAs dose for patients with CHD or to decrease triglyceride levels, fish oil supplements are often

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required. However, in contrast to initial positive RCTs of omega-3 PUFAs, recent RCTs and extensive meta-analyses indicate an insignificant protective impact on cardiovascular results from omega-3 PUFA supplementation (Freeman et al. 2017, p. 1173; Aug et al. 2018, p. 226). The findings of these studies have created uncertainty among health care providers, especially when they recommend omega-3 PUFA supplementation in line with clinical guidelines. Therefore, recent RCTs raise questions about the role of omega-3 PUFAs in CHD treatment.

The objective of this review is to assess the RCTs as well as scholarly evidence of omega-3 PUFAs to have a clear understanding of the present role of omega-3 PUFAs in reducing or preventing the risk of CHD.

Review of literatures

It is widely accepted that omega-3 PUFAs partly reduce triglycerides serum levels through a decreased hepatic synthesis of low-density lipoprotein and enhancing fatty acids degradation and acceleration of triglycerides clearance out of plasma (Abdelhamid et al. 2018; Rhee et al. 2017, p. 11; Yagi et al. 2017, p. 999). About the impact of omega-3 PUFAs on lipoproteins, RCTs have led to mixed outcomes. A majority of clinical trials have confirmeda rise in low-density lipoprotein when using DHA and about a third of the studies when using EPA (Stark et al. 2016, p. 133; Wang and Hu 2017, p. 424; Nettleton et al. 2017, p. 27). On the other hand, high-density lipoprotein has been found to rise in several proteins with the use of DHA supplements, whereas the reaction in EPA supplements has been changing (Virtnen et al. 2018, p. 429; O'Connell et al. 2017, p. 75; Nestel et al. 2017, p. 770). Many clinical trials have demonstrated the impact of omega-3 PUFAs on enhancing flow-mediated arterial dilation and the enhancement of automatic heart functioning.

Mediterranean Diet, Fatty Fish, and Heart Disease

Extensive research has demonstrated that the consumption of boiled or baked fish is firmly linked to a lower heart rate and systemic cardiac resistance and decreased CHD occurrence (Siscovick et al. 2017, p. 869; Molfino 2017, p. 89). Dietary guidelines provided by the AHA (American Heart Association) recommends the consumption of different types of oily fish at least two times in a week (Aggarwal, Aggarwal, and Rao 2017, p. 897; Thuppal et al. 2017, p. 930). Some studies show firm evidence of fish consumption benefits for cardiovascular health. Chen et al. (2016, p. 28165), Orsavova et al. (2015, p. 12872), and Wang et al. (2016, 133) assert that fish species that are rich in DHA and EPA is linked to lower risk of CHD. Seafood is a significant constituent of the Mediterranean diet, which is rich in fruits, vegetables, cereals, as well as olive oil (Blondeau 2016, p. 50; Kakoti et al. 2015, p. 38; Paoli et al. 2015, p. 998). Several studies have shown the benefit of dietary intervention in lowering the risk factors related to Cardiac Diseases (CVDs) (Wang et al. 2016, p. 1135; Micha et al. 2017, p. 914). Some recent primary prevention randomised trials involving at least 6,000 patients with high-risk heart activities demonstrate that when the Mediterranean diet is complemented with additional natural olive oil or nuts, it can minimise the frequency of significant CHD (Patel et al. 2016, p. 635; Chilton 2017, p. 1165).

Omega-3 Supplements

More often, omega-3 PUFAs are readily accessible as over-the-counter dosages, but a few like DHA and EPA are prescription drugs (Watanabe and Tatsuno 2017, p. 866; Forouhi et al. 2018, p. 2139). Over the last twenty years, several RCTs have assessed the effectiveness of omega-3 supplementation in different cardiac conditions, yielding mixed outcomes. A number of studies have examined the effect of omega-3 PUFAs on reducing CHD and other cardiovascular events among persons with MI or chronic heart failure history while others have measured their effectiveness in mixed secondary prevention contexts (Sekikawa et al. 2014, p. 568; Tortosa-Caparrós et al. 2017, p. 3422). Four RCTs conducted in different countries studied people with a history of chronic coronary syndromes (Kones, Howell, and Rumana 2017, p. 499; Del Gobbo et al. 2016, p. 1156; Chowdhury et al. 2014, p. 399; Widmer et al. 2015, p. 230).

Below are the findings of the four different studies:

An RCT by Del Gobbo et al. (2016) conducted in Italy showed that daily supplementation of 1g Omega-3 PUFAs substantially reduced the integrated primary outcome of death and non-fatal MI and arrhythmias amongst 2800 participants for approximately three and half years (Del Gobbo et al. 2016). Another RCT in France found no considerable decline in significant cardiac outcomes, including cardiovascular mortality among over 600 people following the use of 600 mg omega-3 PUFAs for about four years (Widmer et al. 2015, p. 154; Bonila et al. 2016, p. 225; Molfino 2017, p. 87; Archibong, J. E 2020). The third RCT conducted in Holland found out that daily supplementation of about 225 mg EPA and 148 mg DHA did not substantially minimise the occurrence of main cardiac outcomes among 1082 people for three years and four months (Kones, Howell, and Rumana 2017, p. 500). The fourth RCT conducted in Germany tested the impact of highly purified omega-3 PUFAs found out that extra protection against accidental coronary mortality and other cardiovascular outcomes for over 1900 people treated for chronic MI and 1g omega-3 daily for twelve months (Chowdhury et al. 2014, p. 400).

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In the context of heart failure, several RCT in Italy indicate sight reductions in the risk of CHD and decrease in hospitalizations for cardiovascular reasons as a result of consuming 1g of omega-3 supplement for averagely 4 years among 3500 participants (Bird, Calder, and Eggersdorfer 2018, p. 105; Akkbaraly et al. 2018, p. 8620). Nevertheless, for a well-planned RCT, the study outcome attained statistically significant variations.

Electrophysiological impacts of omega-3 PUFAs are suggestive of their anti-arrhythmic characteristics (Davis et al. 2015, p. 9140; Arca et al. 2017, p. 100). However, it is worth noting that human trials about arrhythmia demonstrate mixed outcomes. Several controlled studies have attempted to demonstrate the clinical utility of the electrophysiological properties. For instance, a study of over 200 participants affected with atrial fibrillation (AF) demonstrate that 12 months' supplementation with a daily dosage of 2g of Omega-3 PUFAs assisted in maintaining sinus rhythm following a direct current cardio-version (Hamley 2017, p. 30; Lentjes et al. 2017). Two other studies involving over 500 participants with AF and 500 patients with a history of tachycardia failed to show a reduction in recurrent AF and tachycardia after about 12 months of supplements with 1g and 2g omega-3 supplementation in that order (Papanikalaou et al. 2014, p. 31; Yagi et al. 2017, p. 1002). There are no risk reduction or prevention studies, which have conducted studies on the effect of omega-3 supplementation on cardiac outcomes (Micha et al. 2017, p. 913; D'ascoli et al. 2016, p. 970). Nevertheless, a study of over 300 healthy people between 18 and 35 years showed that irrespective of lower serum triglycerides levels as well as low-density lipoprotein, no enhancement occurred in endothelial function following supplements with 1.5g DHA for 4 months (Calder 2015, p. 23; Stark et al. 2016, p. 135).

Clinical Evidence

Several prospective trials, large RCTs, and many reviews have assessed the advantages of seafood or omega-3 PUFAs on cardiac outcomes. Of which several of them have demonstrated a substantial decrease in CHD fatality and cardiac events among people at risk or with cardiovascular disease. However, others clinical studies and systematic reviews have failed to show a reduction in CHD endpoint outcomes with omega-3 PUFA supplements (Maki, Palacios, Bell, and Toth, 2017, pp.1152-1160).

Positive Clinical Studies

Four extensive RCTs have demonstrated benefits of omega-3 PUFAs in decreasing CHD and other cardiovascular events (Aggarwal, Aggarwal, and Rao 2017; Li et al. 2017; Colussi et al. 2017; Blondeau 2016). The four RCTs include DART (Diet and Reinfarction Trial), GISSI-Prevenzione, JELIS, and GISSI-HF. DART randomised over 2,000 male participants with latest MI to have or not to have a dietetic intervention of consuming two portions of fatty fish at a minimum on a weekly basis (Colussi et al. 2017, p. 194). The research found out that people that followed the advice of eating fatty fish showed a 30 per cent decrease in all-cause morbidity, having primarily been influenced by a decrease in the risk and mortality of CHD (Colussi et al. 2017, p. 197). The GISSI-Prevenzione clinical trial randomised at least 10,000 people with recent MI receiving either 800 mg of DHA and EPA and 300 mg of Vitamin E on a daily basis, with a complement of both, or none (Aggarwal, Aggarwal, and Rao 2017, p. 902). The study found out that medication with omega-3 PUFAs minimised the primary cardiovascular outcome by 14.5 per cent. Among personal endpoint outcomes, omega-3 PUFAs lowered all-cause morbidity by 19 per cent, unexpected cardiac death by 40 per cent and cardiovascular mortality by 32 per cent (Aggarwal, Aggarwal, and Rao 2017, p. 904). The research did not show the disparity between various treatment groups for non-fatal cardiac outcomes. The decrease of unexpected cardiovascular mortality was mainly present in participants with left ventricular systolic malfunction, which supports an antiarrhythmic impact of omega-3 PUFAs (Aggarwal, Aggarwal, and Rao 2017, p. 909). Many clinical trials have shown that omega-3 PUFAs can lower the risk of unexpected cardiac death and ventricular arrhythmias among patients with structural heart conditions.

JELIS (Japan EPA Lipid Intervention Study) trial explored omega-3 supplementation for both primary and secondary prevention. This study randomised over 18,000 people, mainly female participants with hypercholesterolemia to receive a statin with placebo or 1, 750 g of EPA a day-to-day basis (Li et al. 2017, p. 580). Among patients with CHD, the group that was under EPA treatment experienced a significant 20 per cent decrease in primary cardiac outcomes, mainly due to the decline in nonfatal MI and unsteady heartburn (Li et al. 2017, p. 581). EPA treatment indicated a 19 per cent in major coronary events in the primary prevention group, though this outcome did not attain statistical significance (Li et al. 2017, p. 582). Nonetheless, a subsequent review showed a 52 per cent decrease in major cardiovascular outcomes in the group of primary carepatients characterised by low high-density lipoprotein and high triglyceride. Supplementation of EPA did not minimise CHD risk in the two groups (Aung et al. 2018, p. 229; Nettleton et al. 2017, p. 783).

The GISSI-HF study randomised over 6,000 patients with acute heart failure to take either placebo or 850 mg DHA and EPA (Blondeau 2016, p. 53). Patients were randomly grouped to receive 15mg of placebo or rosuvastatin. It is worth noting

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that omega-3 PUFAs led to small but substantial 2 per cent decrease in all-cause mortality and 3 per cent decrease in death or hospitalisation for any cardiovascular reasons (Blondeau 2016, p. 54). It is worth noting that the difference was not statistically significant even though the decrease in arrhythmic morbidity was lower inthe group under omega-3 PUFAs.

Negative Clinical Outcomes

Four other significant trials have not succeeded in showing any omega-3 PUFAs benefit in lowering cardiovascular endpoints or events, which is a sharp contrast to the four trial with positive outcomes (Sacks et al. 2017; Freeman et al. 2017; Calder 2015; Sekikawa et al. 2014). First, DART 2 trial conducted a research in male patients with angina failed to produce similar results of the DART 1trial (Freeman et al. 2017, p. 1177). The study randomly grouped respondents following an MI to placebo or omega-3 supplementation. Nevertheless, unlike GISSI-HF and GISSI-Prevenzione studies, no decrease in CHD cardiovascular events was observed (Freeman et al. 2017, p. 1179). A post review of the trial indicated that a combination of DHA and EPA decreased fatal CHD by 38 per cent for patients with MI and diabetes (Patel et al. 2016, p. 639). Second, the SU.FOL.OM3 clinical study randomised about 2,500 patients with histories of CD and grouped them to supplementation of placebo or vitamins or to an integration of 300 mg EPA and 150 mg DHA or placebo on a daily basis (Sekikawa et al. 2014, p. 571). In this clinical trial, omega-3 supplementation did not show any substantial benefit concerning decreasing main cardiovascular events.

Recently, the study of Sacks et al., (2017) randomised about 12,000 high-risk people with or without diabetes and grouped them to have olive oil placebo capsules or 840 mg of DHA and EPA (Sacks et al. 2017, p. 12). Omega-3 PUFAs treatment did not yield a decrease in coronary outcomes in comparison to placebo. In addition, Calder (2015) conducted a meta-analysis that included 22 RCTs. The main objective of the examination was to evaluate the impact of omega-3 PUFAs on cardiac outcomes. However, the review failed to demonstrate any statistically significant relationship between cardiovascular outcomes and omega-3 PUFAs (Schunk et al. 2017, p. 73). The study has heavily received criticism for including clinical studies with various doses and sources of omega-3 PUFAs.

Net Benefit of Clinical Evidence

As discussed above, research outcomes of many studies before RCTs were mixed. A number of randomised trials indicating cardiac benefits for omega-3 PUFAs and a number showing their effectiveness. To tackle the clinical dilemma, a systematic review assessed all RCTs completed for the cardiac effects of omega-3 PUFAs in patients between 1990 and 2016 (O'Connell et al. 2017, p. 81). The systematic review included 22 trials having over 68,000 randomised participants. The average follow-up period for the selected trials was 24 months. It is important to highlight that half of the studies had been carried out when statins were frequently instructed for cardiac risk change (Wang and Hu 2017, p. 431). The systematic review indicated that omega-3 PUFAs are not linked substantially to increase or decrease in all-cause mortality, MI, Stroke, or premature death (Zendedel et al. 2015, p. 205). In addition, another study by Monahan et al. (2015) reveals that omega-3 PUFAs is not related to a considerable decrease in composite coronary endpoint outcomes (p. 107).

Three additional trials have been published since the publication of the outlined systematic reviews. The first randomised trial explored the impacts of effective omega-3 supplements on surgical atrial fibrillation (AF) in participants in the process of cardiac surgery (Micha et al. 2017, p. 917). The outcome demonstrated no substantial reduction of the risk of surgical AF by omega-3 supplementation (Micha et al. 2017, p. 921). This outcome is consistent with that of Paoli et al. (2017), who researched at least 600 patients in a RCT (p. 1001). In their research, a 2-year treatment with omega-3 supplements did not show a reduction in the frequency of recurrent AF (Paoli et al. 2017). The third randomised trial assessed the impacts of omega-3 supplements on a group of at least 12,000 people with cardiovascular risk factors (O'Connell et al. 2017, p. 83). After follow-up for about five years, daily supplements of 1g omega-3 PUFAs did not decrease death occurrence from cardiovascular causes or hospitalisation because of cardiovascular causes (Nestel et al. 2017, p. 775).

Evaluation of the advantages of omega-3 PUFAs on CVD risk factors, especially on CHD

It is difficult to justify the indefinite impact of omega-3 PUFAs, particularly on endpoint cardiac outcomes. Possibly, there might be a number of reasons for this. First, bias in publication, selective reporting, or selective citation favouring studies suggesting benefits of omega-3 PUFAs on CHD risk factors is likely (Maehre et al. 2015, p. 22638; Eckel et al. 2017, p. 24). For instance, the positive GISSI-Prevenzione study has been cited more often in comparison with similar studies indicating negative outcomes (Tortosa-Caparrós et al. 2017, p. 3425). It is highly likely that the expected clinical benefits of omega-3 PUFAs are less vigorous than broadly viewed. Nevertheless, due to either selective publication, biased reporting, or biased citation, studies yielding positive outcomes are more popularised.

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In addition, it is widely known that enhancing risk factors would not necessarily cause improvement in cardiovascular endpoints like death (Watanabe and Tatsuno 2017, p. 871). Moreover, seafood, particularly fish, could be containing several active ingredients that research has not yet completely revealed (Rhee et al. 2017, p. 16). Apart from omega-3 PUFAs, fish contains selenium, vitamin D, and many mineral components (Maki et al. 2017, p. 1155). A systematic review of 25 prospective studies and 10 RCTs established the relationship between fish intake and omega-3 supplements cardiovascular conditions, with the inclusion of CHD with 790,000 non-overlapping participants (Siscovick et al. 2017, p. 877). The review indicates that although fish consumption has an average inverse relationship with cardiovascular risks, there was no similar relationship between circulation omega-3 PUFAs level with cardiovascular conditions (Siscovick et al. 2017, p. 881).

Explanation of the Differences in Clinical Studies

Many possible explanations account for differences between clinical trials of omega-3 PUFAs, including variations in omega-3 PUFA dosage, trial design, follow-up duration, patient characteristics, as well as good compliance with evidence-based guidelines of cardiac treatment in participants grouped for omega-3 supplements (Patel et al. 2016, p. 639). DART (Diet and Reinfarction Trial) I and II enrolled participants after MI and both trials did not demonstrate the role of omega-3 PUFAs in minimising cardiac outcomes (Stark et al. 2016, p. 144). Among randomised patients in DART 1, the use of blood pressure-reducing medicines was high at 90 per cent, as was the use of lipid-lowering drugs at 88 per cent, and antithrombotic agents at 96 per cent (Wang and Hu 2017, p. 441). In DART 2 trial, 80 per cent were on statins, 95 per cent on aspirin, 85 per cent on beta-blocker, and clopidogrel at 87 per cent (Aung et al. 2018, p. 232). In the GISSI-Prevenzione study, the trial enrolled participants after the latest MI and managed to indicate a benefit to omega-3 PUFAs in lowering cardiovascular events, the use of beta-blockers was low at 6 per cent and 40 per cent in cholesterol-lowering drugs at baseline (Del Gobbo et al. 2016, p. 1161). Moreover, in GISSI-Prevenzione cardiac revascularisation was low at 6 per cent (Del Gobbo et al. 2016, p. 1162).

The variations in omega-PUFAs dose among treated patients might explain the difference in outcomes among the RCTs. For instance, the JELIS trial randomly grouped participants to 1750 mg EPA daily and indicated a significant decrease in cardiac outcomes (Davis et al. 2015, p. 9147). The dosage of omega-3 PUFA is higher when compared to other clinical trials, and therefore high doses might be required to minimise coronary events, while the advantage of decreasing CHD risk might occur at lower omega-3 PUFA doses (D'ascoli et al. 2016, p. 970). In both GISSI-HF and GISSI-Prevenzione, a dosage of 1g of omega-PUFA was recommended, and both trials yielded positive results. Additionally, the time between active treatment following MI and randomisation could have affected the study outcomes, a re-evaluation of the GISSI-Prevenzione data indicate a decreases in cardiovascular events (Kakoti et al. 2015, p. 38).

The other vital explanation for the sharp differences in the studies is that many studies did not enrol participants with heart failure. Patients with heart failure face the highest risk of CHD (Micha et al. 2017, p. 919). In a re-examination of the GISSI-Prevenzionestudy, the decrease in the unexpected endpoint to participants with systolic malfunction. Furthermore, the few heart failure participants in clinical studies might substantially be contributing to adverse outcomes (Paoli et al. 2015, p. 1007).

Conclusions

There is significant evidence that omega-3 PUFAs have substantial benefits in minimising the risk of CHD and CHD morbidity. One of the intriguing aspects about omega-3 PUFAs beneficial action is that it is not attained through a single action mechanism, but seems to be attained through various effects on blood, vasculature, and the heart, making PUFAs even more vital as a therapeutic model. Irrespective of several studies about omega-3 PUFAs, the evidence is not explicit about its benefits on CHD as the existing research outcomes are mixed. The major possible challenge over the years has been ignoring equally robust studies on negative clinical outcomes by reporting evidence of positive clinical outcomes with biases. It is worth noting that much is yet to be explored about the health-related benefits of omega-3 PUFAs. Nonetheless, in light of the existing clinical evidence, it can be concluded that omega-3 PUFAs yield cardiac benefits, but the positive outcomes could be insignificant as they will be minimal if any. In addition, it is not clear if there is a subgroup of patients that would benefit most from omega-3 PUFAs. However, there is a need to educate patients about omega-3 PUFAs benefits in reducing CHD events. Again, AHA recommends the consumption of various types of oily fishes twice a week. Overall, omega-3 PUFAs help in the reduction of the risk of CHD and CHD mortality.

Recommendations

Omega-3 PUFAs decrease triglycerides and have several favourable cardiovascular impacts (Thuppal et al. 2017, p. 931). Irrespective of the mixed findings among the studies, the clinical evidence of the role of omega-3 PUFAs in minimizing the risk or preventing coronary events, particularly in people with heart failure issues, diabetes, MI, as well as patients that

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do not receive optimal treatment for their CHD (Chowdhury et al. 2014, p. 402). Nevertheless, many issues that need to be addressed remain unresolved and ongoing studies are required.

A number of areas to consider for future research include whether decreasing triglycerides improves CHD outcomes if higher omega-3 PUFAs doses are most effective, and how omega-3 supplements affect CHD patients that have not been well treated or those who have poor dietary consumption habits of omega-3 PUFAs.

Patients with CHD, those with or at risk of CHD should take the right dose of omega-3 PUFAs. Much higher doses are required to decrease triglyceride levels.

Extensive research on omega-3 PUFAs needs to be done before conclusions about their role in reducing the risk of CHD or CHD can be done.

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