

Knowledge, Perceptions, and Patterns of Fish Oil Use in Cardiac Patients

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Journal of Pharmacy Practice
2020, Vol. 33(5) 580-585
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DOI: 10.1177/0897190018824485
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Abstract

Background: Fish oils are the most widely used nonvitamin, nonmineral dietary supplements in the United States. They are not over-the-counter medications and are neither approved nor indicated for treating disease. Patient knowledge and patterns of fish oil use are not well defined. **Objective:** To determine cardiac patients' knowledge and patterns of fish oil use. **Methods:** One thousand consecutive patients admitted to an in-patient cardiology service (2015-2017) taking fish oil dietary supplements or prescription omega-3 fatty acids were asked to complete an anonymous questionnaire concerning product knowledge and use. **Results:** A total of 711 (71%) patients completed the questionnaire. Primary reasons for use included general health (34%), heart health (28%), arthritis (9%), and lipid disorders (8%). Few patients (14%) were advised to take fish oil products by a health-care provider. Only 2.5% were taking prescription omega-3 fatty acids. Only 26% knew the active ingredient in their fish oil product. Supplements were purchased through a nonpharmacy retail seller by 81% of respondents. **Conclusions:** Most cardiac patients consuming fish oil dietary supplements do so without medical supervision and without knowledge of the active ingredients. As most patients obtain supplements outside of a pharmacy, opportunities to monitor and educate patients remain a major challenge.

Keywords

dietary supplements, docosahexaenoic acid, eicosapentaenoic acid, fish oil, omega-3 fatty acids

Introduction

The long-chain polyunsaturated omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are the primary active ingredients in fish oil dietary supplements and purified prescription omega-3 fatty acids. EPA and DHA are important nutrients that are often cited as having a range of potential beneficial effects on several aspects of health including cardiovascular health, aging, brain health and development, and eye health.¹⁻⁶ As a means of general health promotion, dietetic and nutrition organizations recommend daily intake of 500 mg of omega-3 fatty acids as a part of a healthy diet for adults to prevent essential fatty acid deficiency.⁷⁻⁹ Perhaps for these reasons, fish oil products have become the most widely used nonvitamin, nonmineral dietary supplements in the United States.^{10,11} The use of fish oil dietary supplements was found to have increased more than 9-fold between 1999 and 2012 and nearly doubled between 2007 and 2012.^{10,11}

Despite the rising use of fish oil dietary supplements, misconceptions that have important implications for their use persist. Most individuals are unaware that fish oil dietary supplements are not approved or indicated for the treatment of any disease, are not over-the-counter (OTC) drugs, and do not typically contain the same quality or quantity of active ingredients compared to prescription omega-3 fatty

acids.^{12,13} Hence, dietary supplement fish oils are not interchangeable with prescription omega-3 fatty acid products.

Based on the widespread use of fish oil dietary supplements, this study was conducted to assess patient knowledge and patterns of use of these supplements and prescription omega-3 fatty acids to better understand possible misconceptions and the potential role of health-care professionals, including pharmacists, in guiding and educating patients.

Methods

Study Design and Participants

This study was conducted at Creighton University Medical Center, Omaha, Nebraska from January 2015 through March 2017. The study was approved by the University's institutional review board. One thousand consecutive patients admitted to

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the cardiology service who were taking fish oil products were asked to complete an anonymous questionnaire about their understanding and use of these products.

Questionnaire and Measures

Respondents provided demographic information including their age, gender, race, height, weight, education, and cardiovascular and other medical history. The survey consisted of 10 questions with multiple-choice answers about fish oil product use aimed at determining patients' reasons for taking fish oil products and their knowledge of the active ingredients (eg, DHA, EPA), prescriber recommendations, brand of fish oil product, place of purchase, use of prescription omega-3 fatty acids versus fish oil dietary supplements, monthly costs, and pill burden (number of pills and frequency of administration). The survey was self-administered. Survey responses were anonymous and were handwritten.

Statistical Analysis

Descriptive statistics were used to summarize and describe the data.

Results

Respondents

Of the 1000 cardiac patients who were offered this survey, a total of 711 (71%) completed the questionnaire. A summary of respondent demographics is shown in Table 1. Most were older (mean age: 70.3 years), white (68%), female (57%), and had an annual income of less than US\$50,000 per year. More than 75% had not completed college. Key medical conditions per patient histories are shown in Table 2. The most common cardiovascular-related conditions were hypertension and dyslipidemia. Other common diseases included diabetes, chronic obstructive pulmonary disease/asthma, and depression.

Reasons for Use

The primary reasons for the use of fish oil dietary supplements cited by the survey respondents were general health (34%, $n = 241$) and cardiovascular health or diseases including heart health (28%, $n = 197$), coronary artery disease/myocardial infarction (12%, $n = 89$), and lipid disorders (8%, $n = 54$; Figure 1A). Few of those surveyed (14%, $n = 99$) responded that they were advised by a health-care provider such as a pharmacist or physician to take a fish oil dietary supplement (Figure 1B). Most respondents (86%, $n = 612$) decided to take fish oil dietary supplements based on recommendation from a friend, a family member, or on their own (Figure 1B).

Table 1. Patient Demographics.

Demographic	N = 711
Age, mean (SD), years	70.3 (8.9)
Weight, mean (SD), pounds	170.1 (23.8)
Height, mean (SD), inches	68.7 (5.9)
BMI ≥ 30 (kg/m ²), n (%)	135 (19)
Women, n (%)	406 (57)
Race, n (%)	
White	483 (68)
Hispanic	117 (16)
Black	81 (11)
Asian	22 (3)
Native American	8 (1)
Highest education level, n (%)	
High school	305 (43)
Some college	249 (35)
College degree	83 (12)
Professional degree	38 (5)
Graduate degree	36 (5)
Annual income, n (%) ^a	
<US\$35K	294 (41)
US\$35K to US\$49.9K	249 (35)
US\$50K to US\$74.9K	85 (12)
US\$75K to US\$99.9K	64 (9)
\geq US\$100K	19 (3)

Abbreviations: BMI, body mass index; SD, standard deviation.

^aIncome given in US dollars.

Table 2. Patient Medical History.

Medical Condition	n (%), N = 711
Cardiovascular	
Hypertension	560 (79)
PCI/CABG	527 (74)
Dyslipidemia	480 (67)
Myocardial infarction	422 (59)
Coronary artery disease	375 (53)
Arrhythmia	167 (23)
Heart failure	137 (19)
Valvular heart disease	101 (14)
Peripheral artery disease	71 (10)
Stroke	69 (10)
Other	
COPD/asthma	242 (34)
Diabetes mellitus	241 (34)
Psychiatric/depression	225 (32)
Arthritis	190 (27)
Gastrointestinal disease	171 (24)
Thyroid disease	119 (17)
Renal disease	90 (13)
Liver disease	21 (3)

Abbreviations: CABG, coronary artery bypass graft; COPD, chronic obstructive pulmonary disease; PCI, percutaneous coronary intervention.

Patient Knowledge of Active Ingredient

The majority of respondents (74%, $n = 524$) did not know what the active ingredient was in their fish oil product (Figure 2). Of

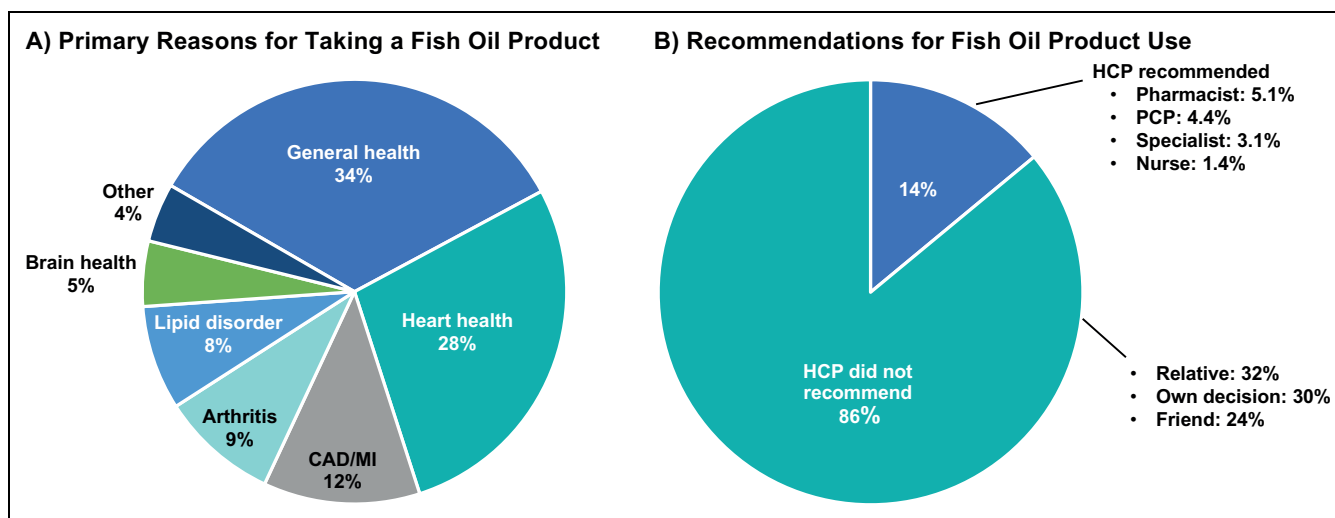


Figure 1. Reasons and recommendations for fish oil product use (N = 711). Abbreviations: CAD, coronary artery disease; HCP, health care provider; MI, myocardial infarction; PCP, primary care provider.

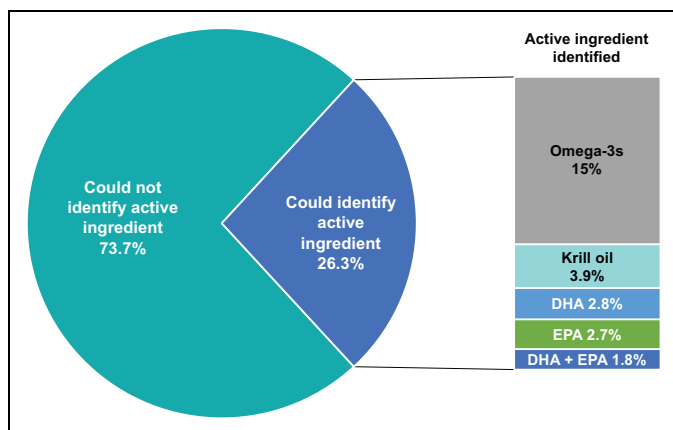


Figure 2. Respondent's ability to name the active ingredient in their fish oil product. Abbreviations: DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid.

the 187 (26%) patients who responded that they knew the active ingredient, the active ingredient was identified as omega-3 fatty acids (n = 107), krill oil (n = 28), DHA (n = 20), EPA (n = 19), or DHA plus EPA (n = 13).

Patterns of Use and Product Cost

Most patients (86%) responded that they were taking 1 (42%) or 2 (44%) capsules at a frequency of once (57%) or twice (26%) daily (Figure 3). A large majority of respondents (81%) stated that they purchased their fish oil dietary supplement from a nonpharmacy retail seller (Figure 4A). Seventeen different fish oil dietary supplement brands were identified, but 215 respondents did not provide a brand. With regard to cost, 59% of respondents paid US\$15 to US\$25 per month, whereas 27% paid more than US\$25 per month and 14% paid less than US\$15 per month for their fish oil product (Figure 4B).

Of the 99 respondents who were advised by a health-care provider to take a fish oil dietary supplement or a prescription omega-3 fatty acid, 27 received a prescription for a Food and Drug Administration (FDA)-approved omega-3 fatty acid drug (3.8% of all respondents). Eighteen of these patients indicated they were filling their prescription (2.5% of all respondents). The prescriptions were for Vascepa[®] (n = 11) and Lovaza[®] generic (n = 7).

Discussion

The results of our survey of patients at a university medical center cardiology service found that most cardiac patients were using fish oil dietary supplements without a health-care professional's recommendation and without medical supervision. Most patients lacked knowledge of the active ingredients in their fish oil products. Only a small minority of patients were using fish oil products because they were advised to do so by their health-care provider. These data suggest that there is an unmet need for health-care professionals to counsel and educate patients regarding fish oil dietary supplements and prescription omega-3 fatty acids. Most patients paid US\$15 to US\$25 per month and nearly 30% paid more than US\$25 per month.

Although most of the respondents in our survey were taking fish oil dietary supplements for general, heart, or brain health, nearly 30% of patients were taking these products for specific diseases such as lipid disorders (8%), arthritis (9%), or coronary artery disease/myocardial infarction (12%). This underscores a common misconception about omega-3 dietary supplement use. Omega-3 dietary supplements are not approved by the FDA as treatments for any disease.^{4,12,14,15} The only FDA-approved indication for omega-3 prescription products is to treat severe hypertriglyceridemia (triglyceride levels of ≥ 500 mg/dL). This indication includes a recommended daily dose of 2 to 4 g of prescription quality omega-3 fatty

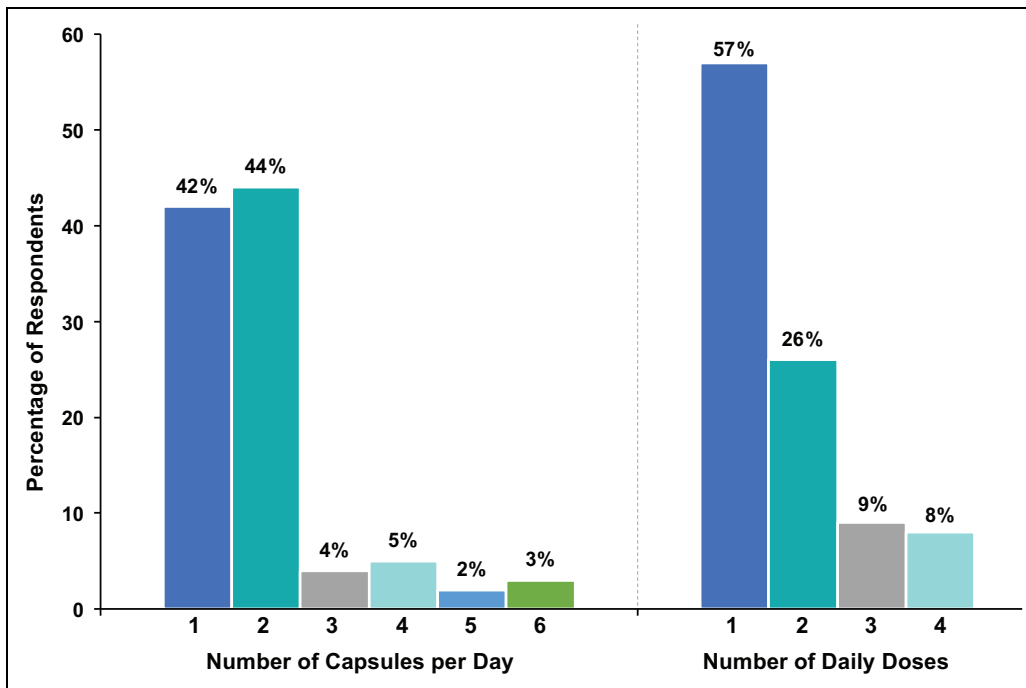


Figure 3. Number of pills per day and frequency of administration.

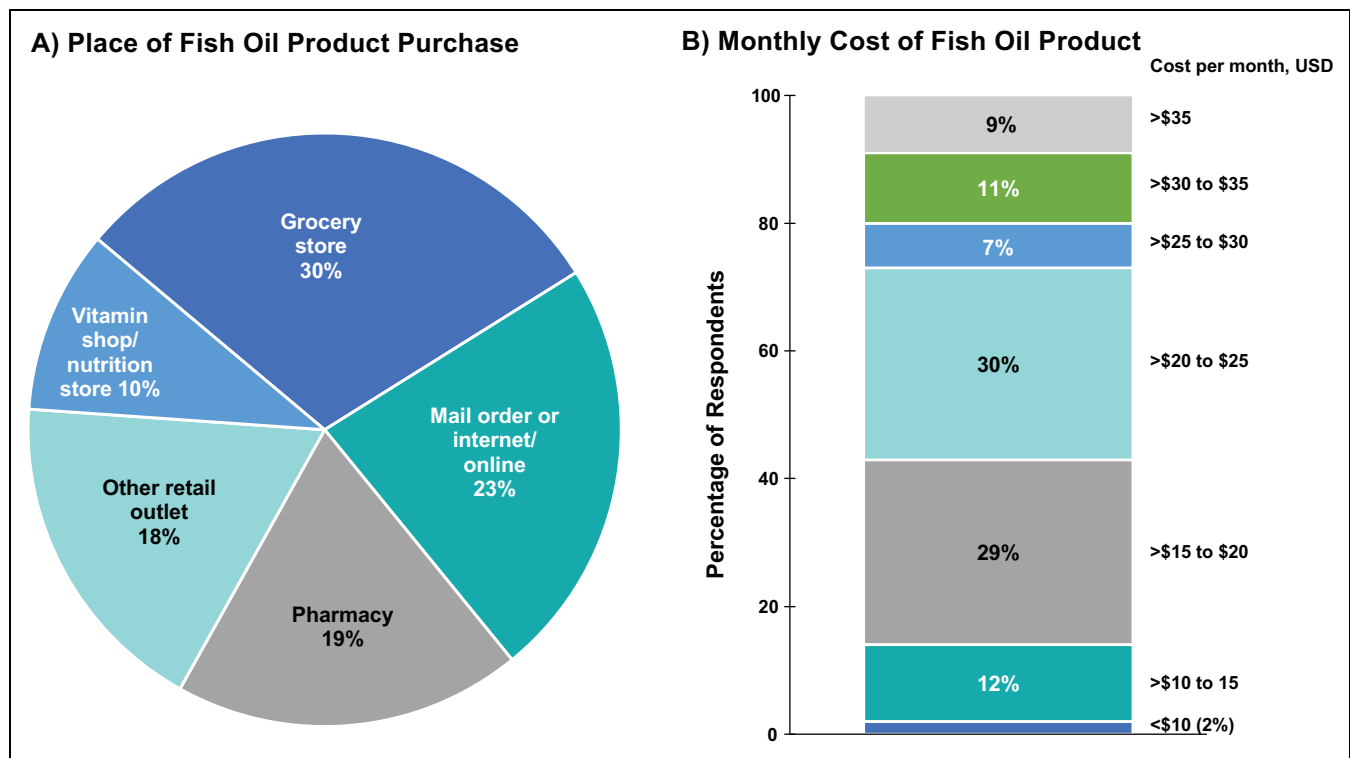


Figure 4. Place of fish oil product purchase and cost. Abbreviation: USD, US dollars.

acids.¹⁶⁻¹⁸ Fish oil dietary supplements should not be substituted for the FDA-approved prescription omega-3 fatty acids.^{4,12,14} Only 4% (27 of 711) of cardiac patients in our survey received

a prescription from their health-care provider and only 2.5% (18 of 711) were filling their prescription for an FDA-approved omega-3 fatty acid product.

The findings of our survey are supported by other patient surveys regarding use of omega-3 products.^{19,20} A survey of 496 cardiac patients by Hawkins and colleagues²⁰ reported that 40% of respondents were taking a fish oil product for general health, while 60% were taking the product for a specific disease.²⁰ Only 9% were advised to take a fish oil product by their physician, 10% of patients stated they were taking fish oil for lipid disorders, and only 4% were given a prescription for an FDA-approved omega-3 fatty acid drug.²⁰ Another recent survey by Backes and colleagues¹⁹ found that there are gaps in patient knowledge regarding active ingredients and dosing of fish oil dietary supplements, even among well educated and affluent patient populations.¹⁹ Their study showed that patients' actual intake of omega-3 fatty acids was approximately 50% less than what was recommended by their health-care provider. The investigators also noted the existence of confusing product labeling for fish oil dietary supplements that may lead to incorrect dosing. Factors that influenced product selection included substitution of lower cost products and switching from their usual brand, which may also contribute to the dosing differences.

There are several general but important distinctions between dietary supplements and products classified as OTC or prescription medications that patients and health-care professionals may be unaware of, including differences in regulation, manufacturing, product purity/quality, and product labeling/content.^{4,12,14,15} It is critical to note that dietary supplements are not categorized as OTC products.^{12,15} It is also important to understand that dietary supplements are not subject to the same manufacturing standards and quality controls as OTC medications.^{4,12,15} Manufacturers of dietary supplements are not required to demonstrate the safety or effectiveness of their products prior to marketing.^{21,22} The Dietary Supplementation Health and Education Act has designated that dietary supplements are assumed to be safe until proven otherwise.^{23,24} By contrast, OTC medications and prescription drugs are highly regulated by the FDA and must demonstrate safety and efficacy in clinical trials prior to receiving marketing approval. The need for health-care professional education on this subject was underscored in a survey of 200 physicians and 150 US pharmacists which found that less than half (41%) correctly stated that OTC medications are regulated and approved by the US FDA and dietary supplements are not.²⁵

In terms of product purity and manufacturing, several studies have found that fish oil dietary supplements can have inconsistent DHA and EPA levels and impurities such as saturated fat, cholesterol, oxidation products, and other contaminants that may exceed recommended safety standards and may adversely affect health.^{14,26-30} The safety of oxidation products is not completely understood, although some data suggest that oxidized lipids can contribute to oxidative stress and cause inflammatory effects in animals and humans, potentially increasing the risk of atherosclerosis and thrombosis.³¹ The prescription products contain highly purified omega-3 fatty acids. The manufacturing process of prescription omega-3 drugs is tightly controlled and regulated.^{12,14}

Patients taking dietary supplement fish oil products should receive education about their relative benefits and risks. As many patients are taking dietary fish oil supplements without supervision from their primary health-care provider, an important opportunity exists for pharmacists to educate patients using these supplements. Patients using dietary supplement fish oil products are adding to their pill burden. Polypharmacy is a documented cause of medication nonadherence. Although we did not evaluate prescription adherence in our survey, it is possible that patients taking dietary supplement fish oil products may be doing so while failing to be adherent to other necessary prescriptions with demonstrated medical indications.

The need for greater awareness of these issues is demonstrated by a recent American College of Cardiology survey of cardiologists and cardiovascular team members, in which only 60% to 65% of respondents reported being extremely or very familiar with fish oil dietary supplements or prescription omega-3 fatty acids.³² Unfortunately, because many individuals may not buy their fish oil products at a pharmacy, pharmacists may have limited opportunities to counsel patients. Despite this potential obstacle, community pharmacists should consider routinely asking their patients about their medication profile, including the use of dietary supplements, update patient profiles, and provide education accordingly.

This study was exploratory in nature and was limited by its single-center design and descriptive statistics, which limit the ability to generalize these findings to larger, more diverse populations. As with other surveys, results may be affected by response bias.

Conclusions

The results of this survey suggest that most cardiac patients who take fish oil products are using dietary supplements without medical supervision. Patients' general knowledge regarding the active ingredients of fish oil products is poor. Because most fish oil dietary supplements contain less than 1 g of omega-3 fatty acids per capsule, the results of our survey suggest that the daily dose of omega-3 fatty acids that most patients are taking is low. Although low-dose omega-3 supplementation may be beneficial in general promotion of health, there is little to no clinical evidence supporting a clinical benefit for such low doses in the treatment of any disease. Health-care professionals, including pharmacists, can play an important role in educating patients on the appropriate use of fish oil products. However, most patients in our survey obtained fish oil dietary supplements outside of a pharmacy and without medical supervision, suggesting that opportunities to monitor and educate patients concerning appropriate use remain major challenges.

Acknowledgments

Medical writing and editorial assistance was provided by Peloton Advantage, Parsippany, NJ, and funded by Amarin Pharma Inc, Bedminster, NJ.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: D.E.H. serves on the Amgen speaker's bureau. R.T. and K.A.P. report no conflicts of interest.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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