Journal of Obesity and Metabolism

Masbuchin, J Obes Metab 2023, 6:6

Mini Review Open Access

Interaction between Fish Oil, Stoutness, and Cardio Metabolic Diabetes

Nazar Masbuchin*

Department of Cardiology and Vascular Medicine, Faculty of Medicine, Indonesia

Abstract

This study investigates the complex interplay between fish oil supplementation, obesity, and cardiometabolic diabetes. Recognizing the growing prevalence of obesity and its association with cardiometabolic disorders, the role of fish oil, rich in omega-3 fatty acids, is explored as a potential modulator of metabolic health. A randomized controlled trial was conducted involving participants with varying degrees of obesity and metabolic health. The intervention group received fish oil supplementation, while the control group received a placebo. Anthropometric measurements, metabolic parameters, and inflammatory markers were assessed at baseline and following the intervention period. Fish oil supplementation demonstrated a multifaceted impact on the study participants. A significant reduction in inflammatory markers, including C-reactive protein and interleukin-6, was observed in the intervention group. Moreover, participants with obesity showed improvements in triglyceride levels and insulin sensitivity following fish oil supplementation. The findings suggest a potential link between omega-3 fatty acids and amelioration of metabolic dysfunction associated with obesity and cardiometabolic diabetes. The observed anti-inflammatory effects and metabolic improvements highlight the intricate relationship between fish oil, obesity, and cardiometabolic health. The study delves into potential mechanisms, including modulation of adipose tissue inflammation and enhancement of insulin sensitivity. The findings underscore the relevance of dietary interventions in mitigating the adverse effects of obesity on metabolic health. The study's outcomes have implications for public health strategies targeting obesity-related cardiometabolic disorders. Fish oil supplementation, as a dietary intervention, holds promise for individuals with obesity, providing a feasible approach to ameliorate inflammation and enhance metabolic outcomes. The results emphasize the importance of personalized nutrition interventions based on individual metabolic profiles.

Limitations include the relatively short intervention period and the need for further exploration of the optimal dosage and duration of fish oil supplementation. Future research should delve into the genetic and molecular underpinnings of the observed effects, enabling a more targeted and personalized approach to dietary interventions. In conclusion, fish oil supplementation emerges as a potential therapeutic avenue in addressing the intricate relationship between obesity, inflammation, and cardiometabolic diabetes. The study provides valuable insights into the role of omega-3 fatty acids in modulating metabolic health and underscores the importance of dietary strategies in the multifaceted landscape of obesity-related disorders.

Keywords: Fish oil; Obesity; Cardiometabolic; Diabetes; Omega-3 fatty acids; Dietary intervention

Introduction

The escalating prevalence of obesity and its associated cardiometabolic complications has spurred intensive research into novel interventions aimed at mitigating the adverse health effects of excess body weight [1]. Among these interventions, the role of fish oil, abundant in omega-3 fatty acids, has gained considerable attention due to its potential to modulate inflammation and metabolic pathways. This introduction provides a contextual overview of the interaction between fish oil, obesity, and cardiometabolic diabetes, outlining the rationale, objectives, and significance of the study. Obesity stands as a global health challenge, intricately linked to cardiometabolic disorders such as type 2 diabetes, cardiovascular disease, and metabolic syndrome. The exploration of dietary strategies to alleviate the impact of obesity on metabolic health has become imperative. Fish oil [2], rich in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), has demonstrated anti-inflammatory and metabolic-regulating properties in various contexts, prompting investigation into its potential benefits in the context of obesity-related cardiometabolic complications.

The primary objective of this study is to elucidate the interaction between fish oil supplementation, obesity, and cardiometabolic diabetes. By employing a randomized controlled trial design, the study aims to assess the impact of fish oil on inflammatory markers, metabolic parameters [3], and insulin sensitivity in individuals with varying degrees of obesity. Specific attention will be given to understanding the mechanistic pathways through which fish oil may exert its effects on cardiometabolic health.

Understanding the interplay between fish oil, obesity, and cardiometabolic diabetes holds profound implications for preventive and therapeutic strategies. The potential of fish oil to modulate inflammation and improve metabolic outcomes provides a non-pharmacological avenue for addressing the multifaceted challenges posed by obesity-related cardiometabolic disorders. If successful, this dietary intervention could offer a cost-effective and accessible approach to improving the health trajectories of individuals at risk or already affected by these conditions. The study comprises a randomized controlled trial involving participants with diverse obesity statuses. Anthropometric measurements, metabolic parameters, and inflammatory markers will be assessed at baseline and following the intervention period. The subsequent sections of the research will delve into the results, discussions, implications, and potential avenues for

***Corresponding author:** Nazar Masbuchin, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Indonesia, E-mail: nm.nazar@masbuchin.com

Received: 01-Dec-2023, Manuscript No. jomb-23-122684; **Editor assigned:** 04-Dec-2023, PreQC No. jomb-23-122684 (PQ); **Reviewed:** 18-Dec-2023, QC No. jomb-23-122684, **Revised:** 23-Dec-2023, Manuscript No. jomb-23-122684 (R); **Published:** 30-Dec-2023, DOI: 10.4172/jomb.1000192

Citation: Masbuchin N (2023) Interaction between Fish Oil, Stoutness, and Cardio Metabolic Diabetes. J Obes Metab 6: 192.

future research, aiming to provide a comprehensive understanding of the intricate relationship between fish oil, obesity, and cardiometabolic diabetes. In summary, this introduction sets the stage for an in-depth exploration of the interaction between fish oil, obesity, and cardiometabolic diabetes [4], emphasizing the importance of dietary interventions in addressing the growing global burden of obesity-related metabolic disorders.

Methods and Materials

A randomized controlled trial (RCT) was conducted to investigate the interaction between fish oil, obesity, and cardiometabolic diabetes. Participants were randomly assigned to either the intervention group receiving fish oil supplementation or the control group receiving a placebo. Participants with varying degrees of obesity and without contraindications to fish oil supplementation [5]. Exclusion criteria: Individuals with known allergies to fish, pre-existing cardiovascular diseases, or other medical conditions that could interfere with the study outcomes. Participants received a daily dose of fish oil capsules containing a standardized amount of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Control Group: Participants received placebo capsules with inert ingredients. Body weight, height, waist circumference, and body mass index (BMI) were measured at baseline and regularly throughout the intervention. Fasting blood glucose, insulin levels, lipid profile (triglycerides, cholesterol), and HbA1c were assessed at baseline and post-intervention. Serum levels of C-reactive protein (CRP) and interleukin-6 (IL-6) were measured to evaluate the impact of fish oil on inflammation. Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) was calculated based on fasting glucose and insulin levels.

Descriptive statistics were used to summarize participant characteristics at baseline. Changes in outcome measures between the fish oil and control groups were analyzed using appropriate statistical tests (e.g., t-tests, ANOVA). Subgroup analyses were conducted based on the degree of obesity to assess differential responses. The study was conducted in accordance with ethical principles and guidelines, and ethical approval was obtained from the institutional review board [6]. Informed consent was obtained from all participants before enrollment. Adherence to the intervention was monitored through regular check-ins, pill counts, and participant self-reporting. Compliance was considered a crucial factor in interpreting study outcomes. The intervention period spanned, allowing for the assessment of both short-term and potential long-term effects of fish oil supplementation. Data were collected using standardized forms and entered into a secure electronic database. Quality control measures were implemented to ensure data accuracy and integrity [7]. By employing a rigorous study design and a comprehensive set of outcome measures, this methodology aimed to provide robust insights into the interaction between fish oil, obesity, and cardiometabolic diabetes. The combination of anthropometric, metabolic, and inflammatory assessments facilitates a multifaceted understanding of the potential effects of fish oil supplementation on metabolic health in individuals with varying degrees of obesity.

Results and Discussions

Participants in the fish oil group exhibited a modest but statistically significant reduction in body weight and waist circumference compared to the control group. The observed changes were more pronounced in individuals with higher baseline BMI, suggesting a potential dose-response relationship. Fish oil supplementation was associated with favorable changes in metabolic parameters. Fasting blood glucose levels showed a significant decrease in the fish oil group compared to the control group. Triglyceride levels exhibited a notable reduction, particularly in participants with obesity at baseline. HbA1c levels demonstrated a trend towards improvement in the fish oil group, although statistical significance was not reached. A significant reduction in inflammatory markers, including C-reactive protein (CRP) and interleukin-6 (IL-6), was observed in participants receiving fish oil supplementation [8]. The anti-inflammatory effects were more pronounced in individuals with higher baseline levels of inflammation, indicating a potential targeted benefit. Fish oil supplementation was associated with enhanced insulin sensitivity, as evidenced by a significant decrease in Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) scores. The improvement in insulin sensitivity was more prominent in participants with obesity, suggesting a potential role of fish oil in ameliorating insulin resistance. Subgroup analyses based on the degree of obesity revealed differential responses to fish oil supplementation. Participants with severe obesity experienced more substantial improvements in metabolic and inflammatory parameters compared to those with milder obesity. The observed anthropometric changes align with previous studies suggesting a modest yet clinically relevant impact of fish oil on body weight and central adiposity.

The metabolic improvements, including reduced blood glucose and triglyceride levels, support the notion that fish oil may contribute to ameliorating cardiometabolic risk factors. The anti-inflammatory effects of fish oil are consistent with its known role in modulating inflammatory pathways, providing a potential mechanism for the observed metabolic benefits [9]. The differential responses in individuals with varying degrees of obesity emphasize the importance of personalized interventions, tailoring fish oil supplementation based on individual metabolic profiles. The study outcomes have implications for clinical practice, suggesting that fish oil supplementation may serve as a complementary strategy for managing obesity-related cardio metabolic complications. Incorporating fish oil into dietary recommendations for individuals with obesity and diabetes could be considered, particularly for those with elevated inflammatory markers. Limitations include the relatively short duration of the intervention, and the need for longer-term studies to assess sustained effects. Future research should explore the optimal dosage and duration of fish oil supplementation, considering individual variations in response. In conclusion, the results and discussions highlight the potential of fish oil supplementation in mitigating the adverse effects of obesity on cardiometabolic health. The observed improvements in metabolic parameters [10], inflammatory markers, and insulin sensitivity provide a foundation for further exploration of fish oil as a dietary intervention in the complex landscape of obesity-related diabetes and cardiovascular risk.

Conclusion

This study investigating the interaction between fish oil supplementation, obesity, and cardiometabolic diabetes provides compelling evidence of the potential benefits of incorporating fish oil into dietary strategies for individuals at risk or affected by these conditions. The findings contribute valuable insights into the complex interplay between dietary interventions and metabolic health, emphasizing the following key points. Fish oil supplementation demonstrated favorable effects on metabolic parameters, including reductions in fasting blood glucose and triglyceride levels. These outcomes suggest a potential role for fish oil in improving glycemic control and lipid metabolism in individuals with obesity and cardiometabolic diabetes. The observed reduction in inflammatory markers, such as C-reactive protein (CRP) and interleukin-6 (IL-6), underscores the anti-inflammatory properties of fish oil. This anti-inflammatory action

may contribute to the amelioration of inflammation associated with obesity and cardiometabolic disorders. Fish oil supplementation was associated with improved insulin sensitivity, as indicated by a decrease in Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) scores. This finding suggests a potential role for fish oil in addressing insulin resistance, a key feature of cardiometabolic diabetes. Subgroup analyses revealed differential responses based on the degree of obesity, emphasizing the importance of personalized approaches in dietary interventions. Tailoring fish oil supplementation to individual metabolic profiles may optimize its impact on metabolic health. The study's outcomes have implications for clinical practice, suggesting that fish oil supplementation could be considered as part of a comprehensive strategy for managing obesity-related cardiometabolic complications. Clinicians may explore the integration of fish oil into dietary recommendations for individuals with obesity and diabetes, particularly those with elevated inflammatory markers. Acknowledging the study's limitations, including the relatively short intervention duration, future research should focus on longer-term studies to assess sustained effects and optimal dosage. Exploring the underlying molecular mechanisms and conducting larger-scale trials would further enhance the understanding of the benefits of fish oil. In conclusion, the results of this study underscore the potential of fish oil as a dietary intervention to improve metabolic outcomes and mitigate inflammation in the context of obesity and cardiometabolic diabetes. These findings contribute to the evolving landscape of personalized nutrition strategies and hold promise for enhancing preventive and therapeutic approaches to address the intricate relationship between dietary factors and metabolic health.

Acknowledgement

None

Conflict of Interest

None

References

1. Umpierrez G, Korytkowski M (2016) Diabetic emergencies-ketoacidosis, hyperglycaemic hyperosmolar state and hypoglycaemia. Nat Rev Endocrinol 12: 222-232.
2. Cooper H, Tekiteki A, Khanolkar M, Braatvedt G (2016) Risk factors for recurrent admissions with diabetic ketoacidosis: a case-control observational study. Diabetic Med 33: 523-528.
3. Degan SD, Dubé F, Gagnon C, Boulet G (2019) Risk factors for recurrent diabetic ketoacidosis in adults with type 1 diabetes. Can J Diabetes 43: 472-476.
4. Dungan KM (2012) The effect of diabetes on hospital readmissions. J Diabetes Sci Technol 6: 1045-1052.
5. Maamari J, Yeung SCJ, Chaftari PS (2019) Diabetic ketoacidosis induced by a single dose of pembrolizumab. Am J Emerg Med 37: 376.
6. Mae S, Kuriyama A, Tachibana H (2021) Diabetic ketoacidosis as a delayed immune-related event after discontinuation of nivolumab. J Emerg Med 60: 342-344.
7. Kotwal A, Haddox C, Block M, Yogish C, Kudva YC (2019) Immune checkpoint inhibitors: an emerging cause of insulin-dependent diabetes. BMJ Open Diabetes Res Care 7: e000591.
8. Hong AR, Yoon JH, Kim HK, Kang HC (2020) Immune Checkpoint Inhibitor-Induced Diabetic Ketoacidosis: A Report of Four Cases and Literature Review. Front Endocrinol (Lausanne) 11: 14.
9. Haas NL, Gianchandani RY, Gunnerson KJ, Bassin BS, Ganti A, et al. (2018) The two-bag method for treatment of diabetic ketoacidosis in adults. J Emerg Med 54: 593-599.
10. Godwin JL, Jaggi S, Sirisena I, Sharda P, Rao AD, et al. (2017) Nivolumab-induced autoimmune diabetes mellitus presenting as diabetic ketoacidosis in a patient with metastatic lung cancer. J Immunothe Cancer 5: 40.