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Vegetarian Diet is associated with a Lower Risk of Cataract, Especially in Overweight Individuals: A Study of the Future

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Abstract

Background: Oxidative stress in the lens of the eye causes cataracts, and plant-based diets can contain a wide range of antioxidants that protect against damage. However, homocysteine levels can rise in strict vegetarians who don't get enough vitamin B-12, which could make them more likely to develop cortical cataracts. Investigating whether vegetarianism's benefits outweigh its risks for cataract development is warranted [1, 2].

Objective: To investigate the potential link between cataract risk and a vegetarian diet in Taiwan

Design: The research was conducted as a prospective cohort study

Participants and setting Dalin Tzu Chi Hospital was the location where 6,002 people were recruited for the Tzu Chi Health Study from 2007 to 2009. A validated food frequency questionnaire was used to assess diet. Participants 40 and older who did not have cataracts at the time of recruitment (3,095 vegetarians and 1,341 nonvegetarians) were followed until they died or developed cataracts at the end of 2014 [3].

Cataract incident cases (International Classification of Diseases, 9th Revision, Clinical Modification code 366) were linked to Taiwan's National Health Insurance Research Database to determine the primary outcome measures.

With age as the underlying scale, Cox proportional hazard regression was used to estimate the relationship between dietary patterns and cataract risk after controlling for potential confounders [4].

Results: Vegetarians consumed more soy, vegetables, nuts, whole grains, dietary fiber, vitamin C, folate, and vitamin A equivalent than nonvegetarians. 476 incident cases of cataracts were identified during the 25,103 person-years of follow-up. A vegetarian diet was linked to a 20 percent lower risk of cataracts (hazard ratio: 0.80; 95 percent confidence interval: 0.65 to 0.99; After controlling for sex, education, smoking, alcohol consumption, physical activity, Tzu Chi volunteer status, hypertension, diabetes, hyperlipidemia, prescription of corticosteroids, and body mass index (Kg/m2), the results (P = 0.04) People who were overweight (defined as having a body mass index of less than 24 in Taiwan) had a stronger association with this [hazard ratio 0.70, 95% CI 0.50 to 0.99; P = 0.04]).

Conclusions: In the study's overweight participants, a vegetarian diet was linked to a lower risk of cataracts.

Keywords: Vegetarian diet; Cataract; Smoking; Tzu Chi Health Study

Introduction

Oxidative stress in the lens of the eye causes cataracts, and plant-based diets can contain a wide range of antioxidants that protect against damage. However, homocysteine levels can rise in strict vegetarians who don't get enough vitamin B-12, which could make them more likely to develop cortical cataracts. Investigating whether vegetarianism's benefits outweigh its risks for cataract development is warranted [5].

Our objective was to investigate the potential link between cataract risk and a vegetarian diet in Taiwan.

Chronic diseases have been largely attributed to unfavorable shifts in global dietary patterns [1]. Dietary risk factors were cited as the cause of 11 million deaths and 255 million disability-adjusted life years (DALYs) in 2017. Cancer was followed by cardiovascular disease as the leading cause of diet-related deaths and DALYs (207 million DALYs). Ischemic heart disease (IHD) mortality decreased from 2005 to 2015, but it continues to be the leading cause of death. [6] Consumption of red meat has been linked to a slight increase in the incidence of total, cardiovascular, and cancer mortality in previous studies. To alleviate this problem, the 2019 American College of Cardiology (ACC)/American Heart Association (AHA) Guideline on the Primary Prevention of Cardiovascular Disease recommended eating fish, whole grains, legumes, nuts, fruits, and vegetables to lower cardiovascular risk (Class: I, Evidence Level: BR). Red meat-free diets, on the other hand, have been found to have no effect on all-cause, cardiovascular, or cancer mortality in recent studies [7].

Plant-based vegetarian diets have gained popularity in recent years and may be regarded as a low-cost and risky treatment option for many chronic diseases. Although vegetarian diets have been linked to lower rates of diabetes mellitus (DM), hypertension (HTN), and insulin-dependent hypertension (IHD), their impact on all-cause mortality is less clear.

Recent studies have found no connection between following a particular diet and its effect on mortality, in contrast to earlier research,

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such as the post-hoc analysis of the PREDIMED trial, which found a significant mortality reduction of 41% with a vegetarian diet. A pescatarian/semi-vegetarian diet was included in antecedent meta-analyses with a similar research question. Adjusted effect measures were not used, IHD or cerebrovascular mortality was not reported, and so on.

We conducted a meta-analysis of observational studies reporting mortality outcomes comparing a vegetarian diet to a non-vegetarian diet in light of this evidence gap [8].

Method

I sampled two large North American communities using MTurk. In sample 1, the average age was 35.47 (SD = 1.79), while in sample 2, it was 35.44 (SD = 11.23). In sample 1, there were 47% women, while in sample 2, there were 45%; White/European-Americans made up 67% of sample 1 and 73% of sample 2, while Black/African-Americans made up 8% and 7%, Asian/Asian-Americans made up 14% and 10%, Latinos made up 8% and 7%, and other racial groups made up 3% and 3%.

Respondents were asked to indicate whether they were meat-eaters, meat-reducers (i.e., made regular efforts to cut back on meat in general, red meat in particular, or red meat and poultry in particular), or veg*ns (vegetarians or vegans). This question was used to measure respondents' vegetarian status. There were 759 vegetarians, 186 meat-eaters, and 58 vegetarians. 766 meat eaters, 188 meat-reduced eaters, and 54 vegetarians comprised.

Rather than using clinical measures of acute depressive episodes, this community sample's depression was measured using questionnaires that inquired about the general tendency to experience negative emotions. In sample 1, the depressiveness facet of the BFI-2 and the depressiveness facet of the CAT-PD were utilized, while in sample 2, the PID-5 depressive scale was utilized. "I have no worth as a person" (PID-5), "I am sad most of the time" (CAT-PD), and "I tend to feel depressed, blue" are examples of items. BFI-2 and CAT-PD items are scored on a 0–4 scale, with higher scores indicating more depression, while PID-5 scores are scored on a 0–3. Averaging item scores was used to calculate scale scores. Using between-subjects ANOVAs, LSD post-hoc comparison tests, and a Type 1 error rate of 0.05, the three diet groups were compared on the three depression scores.

Results

The groups' mean depression scores are presented. The overall F-test in study 1 was statistically significant ($p = 0.013$) at $2,1000 = 4.34$. Meat eaters had the lowest depression scores, according to post-hoc testing, followed by vegetarians and meat-eaters. However, the difference between meat-eaters and meat-reduced individuals was the only one with statistical significance ($p = 0.004$). In Study 2, the same pattern emerged. BFI-2 depression had a significant overall effect ($F(2,1005) = 4.04$, $p = .018$). Post-hoc testing revealed significant differences ($p = .013$) between meat-eaters and meat-reduced individuals, as well as between vegetarians and meat-eaters. ($F(2,1005) = 2.97$, $p = 0.052$) The overall effect on CAT-PD depressiveness was not statistically significant. Post-hoc testing, on the other hand, revealed a significant difference ($p = 0.017$) between meat eaters and meat-reduced individuals. As would be expected based on the effect sizes reported in recent meta-analyses, there were relatively small differences in effect sizes between vegetarians, meat eaters, and meat-reducers.

Discussion

The current prospective cohort study found that a vegetarian diet reduces cataract risk by about 20%. Despite the fact that the association appears to be stronger among overweight individuals, no significant effect modification was found by sex, Tzu Chi volunteer status, hypertension, diabetes, hyperlipidemia, BMI, or corticosteroid prescription [9].

Despite lower vitamin B-12 status and its corresponding elevation of homocysteine in vegetarians in both this cohort26 and the EPIC Oxford cohort27, vegetarian and vegan diets were associated with protective rather than harmful association. The findings of this study are more in line with the EPIC-Oxford Cohort, which found a 26 percent reduced risk of cataracts in vegetarians compared to nonvegetarians20. These results contrast with those of the Blue Mountains Eye Study, which found that a higher risk of cortical cataracts was associated with both an elevation in serum homocysteine and a polymorphism in methylenetetrahydrofolate reductase C677T (CT/TT vs. CC—polymorphisms that influence homocysteine level).19 The results of this current study suggest that the potential benefits of vegetarian diets might outweigh the risk Unfortunately, only a small number of participants in this study and the EPIC-Oxford study had plasma homocysteine available,26,27 preventing further investigation into how homocysteine might affect vegetarians' risk of cataracts.

Meat-free diets are the hallmark of vegetarianism. Previous case–control studies have shown a positive correlation between meat consumption and cataract risk.10,12 High-temperature cooking of meat produces heterocyclic amines, which have been linked to increased oxidative stress28, a significant risk factor for cataract formation, particularly nuclear cataracts.29 Additionally, meat contains heme iron, which is more bioavailable than plant-based non-heme iron30, and a higher iron level can increase oxidative stress.31 It is important to note that nonvegetarians This trend is reflected in the findings that non–Tzu Chi volunteers, who may be more similar to the general population, have a stronger protective association with a vegetarian diet compared to a nonvegetarian diet for cataracts (HR 0.63 vs. 0.82), despite the fact that neither the subgroup analysis nor the test of interaction showed a significant difference—possibly due to the small sample size [10] .

A prospective cohort study found that Swedish women consuming a diet with higher total antioxidant capacity had fewer cataract diagnoses and extractions.9 In another study of cataract patients and age-, sex-matched controls, plant-derived nutrients, including vitamin C, folate, and inositol pentaphosphate, were associated with lower lens opacity.33 In a subsample of this cohort study, vegetarians were reported to have higher median plasma folate than their nonvegetarian counterparts The Elderly Nutrition and Health Survey in Taiwan, which was conducted from 1999 to 2000, found a correlation between folic acid deficiency and cataracts (P 0.01).34 However, serum folic acid levels can serve as a proxy for vegetable intake, and it is not clear whether it is folic acid itself or other components of vegetables that prevent cataracts.

Vegetarian diets have been shown to lower the risk of diabetes in prospective cohort studies. A meta-analysis of randomized controlled trials also found that vegetarian diets lower cholesterol levels.40 In this study, vegetarians had lower BMIs, blood glucose levels, and cholesterol levels. Although adjusting for these cardio metabolic risk factors did not significantly alter the results, it is possible that vegetarians' lower cardio metabolic risk factors also contribute to the protective associations with cataracts. However, in the subgroup analysis by BMI and diabetes, those with diabetes and a BMI greater than or equal to 24 showed a stronger protective association between a vegetarian diet

and cataracts [11]. This suggests that the inverse association between a vegetarian diet and cataracts might be stronger among those who have a higher risk of cardio metabolic disease. The nonsignificant results could be due to the small sample size for subgroup analyses, but it is impossible to say for sure.

Conclusions

This study adds to previous research suggesting a link between vegetarian diets and a lower risk of cataracts in an Asian population in Taiwan. It also suggests that the link may be stronger among overweight people. Encouragement of a plant-based diet can reduce the risk of cardiovascular diseases, diabetes, hypertension, and possibly cataracts in overweight patients receiving medical nutrition therapy; however, a randomized controlled trial will be required to determine its actual effect.

Acknowledgement

None

Conflict of Interest

None

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Table 4: Major millets cultivated in Attappady tribal belt during 2020-21.

Sl NO	Crop	Area under Cultivations Hectares (Ha)			Season
		Panchayaths			
		Agali	Pudur	Sholayur	
1	Finger Millet (Ragi)	200	300	350	May to August, Sept to Dec
2	Little millet (Chama)	175	200	225	May to August, Sept to Dec
3	Great Millet/ Indian Millet- **Sorghum**	175	200	225	May to August, Sept to Dec
4	Pearl Millet (Bajra)	25	50	50	May to August, Sept to Dec
5	Foxtail millet (Thina)	35	35	45	May to August, Sept to Dec
6	Barnyard millet (kadavapullu)	25	30	40	May to August, Sept to Dec
7	Minor Millets (Kodo millet)	23	30	45	May to August, Sept to Dec

Table 5: Nutrition values of various millets in 100 grams.

Food Grains	Carbohydrates (g)	Protein(g)	Fat(g)	Energy (Kcal)	Calcium (mg)	Iron (mg)
Finger Millet	72.0	7.3	1.3	328	34.4	3.9
Little Millets	67.0	7.7	4.7	341	17	9.3
Great Millets	72.6	10.4	1.9	349	25	4.1
Pearl Millet (Bajra)	67.5	11.6	5	361	42	8
Foxtail millet (Thina	60.9	12.3	4.3	331	31	2.8
Barnyard millet (kadavapullu)	65.5	6.2	2.2	307	20	5
Minor Millets (Kodo millet)	65.9	8.3	1.4	309	27	0.5
Source: National Institute of Nutrition Hyderabad						

Figure 1: Hill value brands.