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Impact of Nutrition Education Programs on Chronic Disease Prevention: A Collaborative Study Integrating Nursing, Epidemiology, Family Medicine and Nutrition Perspective

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Abstract

Background: Nutrition education programs play a critical role in chronic disease prevention, addressing the growing burden of non-communicable diseases worldwide. This systematic review examines the impact of nutrition education programs on chronic disease prevention, integrating perspectives from nursing, epidemiology, family medicine, and nutrition. **Method:** A comprehensive literature search was conducted across multiple electronic databases to identify relevant studies published between (2005-2021). **Aim** The review aims to assess the effectiveness of nutrition education programs in reducing risk factors associated with chronic diseases and explore multidisciplinary approaches **Findings:** 15 studies were reviewed and abstracted and the included studies evaluate evidence-based strategies and most of them show a positive effect in changes dietary behaviors, improvements in clinical biomarkers, reduction in disease incidence and prevalence, and enhancement of overall health outcomes. with the aid of education and nutrition programs and some of them highlighted the opportunities for interdisciplinary collaboration in public health initiatives employed in program design and implementation.

Conclusion: Nutrition education programs have emerged as crucial interventions in the global effort to prevent chronic diseases. The collaboration of Nurses, Epidemiology, Nutrition Specialists and Family Medicine has a positive effect in prevention chronic diseases through multidisciplinary approach of nutrition and education programs.

Keywords: "Nutrition education" "Chronic disease" "prevention" "Multidisciplinary approach" "Nursing perspective" "Epidemiology" "Patient education"

Introduction

Chronic diseases, including cardiovascular diseases, diabetes and obesity, represent a significant global health burden, contributing to a substantial portion of morbidity and mortality worldwide **(World Health Organization, 2020).** Numerous studies have demonstrated a direct relationship between socioeconomic status and health status in industrialized and high-income countries; in particular, Non-communicable diseases primarily affect those with the lowest socioeconomic level. **(Williams et al.,2018)**

Despite advancements in medical science and healthcare delivery, the prevalence of chronic diseases continues to rise due to an unbalanced diet, inadequate sleep, physical inactivity, psychological stress, environmental pollution, smoking, or alcohol abuse are all components of an unhealthy lifestyle that can cause metabolic changes necessitating a multifaceted approach to prevention and management**. (Bocedi et al.,2019).** Nutrition plays a pivotal role in the development and progression of chronic diseases, making it a key target for preventive interventions **(Hu, 2002)**.

Nutrition education programs have emerged as critical interventions aimed at promoting healthy dietary behaviors and preventing chronic diseases **(Pomerleau et al., 2005).** These programs encompass a range of educational initiatives designed to improve individuals' knowledge, attitudes, and practices related to nutrition and dietary habits. By empowering individuals with evidence-based information and practical skills, nutrition education programs seek to address modifiable risk factors for chronic diseases, such as poor dietary choices, sedentary lifestyle, and unhealthy eating habits **(Contento et al., 2015).**

The collaborative nature of healthcare delivery presents a unique opportunity to integrate diverse perspectives and expertise in the design and implementation of nutrition education programs. Nursing, epidemiology, family medicine, and nutrition sciences each offer valuable insights and approaches to addressing the complex interplay between nutrition and chronic disease prevention. By leveraging the strengths of interdisciplinary collaboration, healthcare professionals can develop comprehensive and tailored interventions that address the diverse needs and preferences of individuals and communities **(Tiwari et al., 2017).**

Despite the growing recognition of the importance of nutrition education programs in chronic disease prevention, there remains a need for a systematic evaluation of their impact and effectiveness. Existing literature provides valuable insights into the outcomes of various nutrition education interventions, but a comprehensive synthesis of evidence is lacking. By conducting a

systematic review, we aim to fill this gap by synthesizing findings from studies spanning a range of populations, settings, and intervention approaches **(Slavin and Lloyd, 2012**).

We aim to provide a thorough analysis of the impact of nutrition education programs on chronic disease prevention, including changes in dietary behaviors, improvements in clinical biomarkers, a decrease in the incidence and prevalence of disease, and an improvement in overall health outcomes. This collaborative study integrates nursing, epidemiology, family medicine, and nutrition perspectives. Our goal is to present a thorough summary of the body of evidence demonstrating the value of nutrition education in the management and prevention of chronic diseases by combining data from selected studies.

Literature review

1-Objectives:

1. Assess the effectiveness of nutrition education programs in promoting positive dietary behaviors and lifestyle changes among diverse populations.
2. Evaluate the influence of nutrition education on clinical biomarkers associated with chronic diseases, such as blood pressure, cholesterol levels, and glycemic control.
3. Investigate the association between participation in nutrition education programs and the incidence and prevalence of chronic diseases, including cardiovascular disease, diabetes, obesity, and certain cancers.
4. Identify key determinants and mediators of behavior change in response to nutrition education interventions, including psychosocial, environmental, and cultural factors.
5. Explore the potential synergistic effects of integrating multiple disciplines, such as nursing, epidemiology, family medicine, and nutrition, in designing and delivering nutrition education programs.
8. Investigate the long-term sustainability and maintenance of behavior changes induced by nutrition education interventions, including strategies for reinforcement and follow-up.

2- Methods

There were 15 articles included in the review according to certain criteria using electronic research of Google Scholar and reviewing the CINAHIL, PubMed, Medline, and Scopus databases. In addition, the websites of the World Health Organization, and the Centers for nutrition and Disease Prevention were among the related websites that were looked up. English was the language used for the studies. The terms that were employed in the search were "nutrition" "strategies," "educational program," "healthcare," "nursing", chronic disease". To find more research, a manual review of the reference lists of the pertinent papers was done.

3. Inclusion and Exclusion Criteria:

Evaluate original research studies and systematic reviews evaluating the nutrition and education program effect on the prevention outcomes of chronic disease. The chronic diseases incorporated in the review are (diabetes mellitus, hypertension related disease, obesity) Research released between 2005 to January 2021 that were written in English, and concerns nutrition approaches, Research on various educational and interventional technique for the prevention of selected

chronic diseases were also included., healthcare professional subjects collaborated in the educational program and no geographical restrictions were considered, case study included in the review. Publications, without peer review, webcasts, surveys, secondary data analysis, non-original reports, editorials, letters, cost assessments, publication of pregnant and pediatric populations were also rejected

4. Selection Process:

The titles and abstracts of every article that came up in the searches, as well as the complete texts of the pertinent papers that were found, were examined separately by some of the authors. The criteria outlined below were used by the reviewers to evaluate the published full-text papers for inclusion; those that did not satisfy all of the requirements were rejected. and other party adjudication was used to settle disagreements during the full-text review, abstract and title screening, and full-text evaluation.

5. Data extraction and Quality Assessment:

The authors of the review independently evaluated and abstracted the data from the 15 publications that met the inclusion standards. After the included studies were thoroughly examined, pertinent information was taken from each publication based on the following criteria: An author extracted and documented the study design, setting and demographic characteristics, type of chronic disease, intervention program outcome the procedure comprised evaluation of previous studies the authors used methodological, reliable, and health worker interventional criteria to assess and choose the data from the literature search. The quality of the incorporated research was assessed using standardized tools appropriate for the various study designs. Narratively, the research findings from the studies that were included were merged.

6. Interpretation and Conclusion:

Authors Interpret the findings in light of the study objectives, considering the strengths and limitations of the evidence.

Draw conclusions regarding the impact of nutrition education programs on chronic disease prevention, highlighting implications for practice, policy, and future research.

7. Reporting:

Authors adhere to established reporting guidelines for systematic reviews; PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), to ensure transparency and rigor in reporting methods and results

Results

The author reviewed 15 articles based on the inclusion criteria.

Seven studies from (2009-2021) demonstrate the beneficial effect of complex hydrolysable tannins like punicalagin, which is found in pomegranate peel and fruit, small phenols like hydroxy-tyro sol, which is found in extra-virgin olive oil and olive oil byproducts, and catechins, such as epigallocatechin, which is found in green tea, all demonstrate potent antioxidant, anti-inflammatory, antidiabetic, and anti-obesity properties **(Pandey et al.,2009; Bernini et al.,2015;**

Carastro et al.,2017; Mastrogiovanni et al.,2019; Romani et al.,2019; Campo et al.,2020; Urciuoli et al.,2020).

The study of **chin et al.,2016** demonstrate the effect of physical exercises in different techniques dependent and independent on food restriction to evaluate the effect of diet and physical exercises on the weight loss and found that there are improvements in cardiorespiratory fitness and alterations in body composition in relation to controlling overweight and obesity. At six months, diet-only interventions were less successful than diet exercise combined interventions in inducing WL. Usually, these interventions produce 8–11% WL. Interestingly, however, interventions consisting solely of moderate- to high-intensity aerobic exercise and a prescribed diet that were carried out at least three to five times a week also produced a 2-3% reduction in the initial weight within six months. And the study of **Brock et al.,2010** shows the decrease of weight gain after 1-year adherence to aerobic exercise.

A systematic review of 42 studies were identified involving 1843 participants and another study conducted in the USA shows that following walking interventions, there was a significant improvement in the participants' aerobic fitness and diastolic blood pressure (DBP) (−1.54 mmHg, $P = 0.02$) were also significantly reduced as a result of the walking interventions. All things considered, the meta-analysis pointed to a number of health advantages connected with walking interventions. **(Nicholes et al,.2015) (jones and hanson.,2015).**

A group of one hundred individuals with ID, ranging in age from 21 to 73, who resided in a community group home in the North-West Province of South Africa, was enlisted in a cohort study of **(Moss ,2009).** A questionnaire and physical examination were used to create a CHD risk profile. The examination included measurements of resting blood pressure, body mass index, non-fasting glucose and cholesterol, and cardiorespiratory fitness. Following a 12-week physical activity intervention that lasted three days a week, the baseline measurements were taken once more. The findings showed that Both men's and women's percentage body fat decreased and their cardiorespiratory fitness significantly increased as a result of the physical activity intervention, which cut inactivity to 50%.

A randomized controlled trial of **Thuita et al.,2020** with two intervention groups and one control. One of the intervention groups involved a nutrition education programmed with peer-to-peer support. Involving 51 participant. For eight weeks, the nutrition education program met for two hours every week. For eight weeks, the NEP also engaged in weekly peer-to-peer interactions. For six months, each group attended follow-up sessions. the result showed that the nutrition education program (NEP) The anthropometric parameters' mean values improved in the NEP and NE group while they deteriorated in the control group. All groups showed overall improvements in mean blood lipid, fasting blood glucose, and HbA1c values; however, NEP and NE showed the biggest gains, with the exception of triglycerides and HDL, where the control group outperformed the NE. The NEP showed the biggest improvements in relation to changes in food intake patterns and physical activity, which were reflected in changes in the anthropometric and metabolic indicators. There is 2 case study of **American Diabetes Association.,2020; Anderson et al.,2020).** involved in the systematic review from previous data of and provide the following outcome: -

Case Study 1: Patient with Type 2 Diabetes Mellitus (T2DM)

Characteristic	**Description**
Demographics	45-year-old female
Medical History	Type 2 diabetes mellitus
Presenting Complaints	Uncontrolled blood glucose levels, frequent hyperglycemic episodes, frustration with glycemic control
Assessment	Limited knowledge about carbohydrate counting, portion control, and glycemic index of foods
Intervention	Individualized nutrition education program tailored to patient's cultural preferences, dietary habits, and lifestyle
Program Components	Interactive sessions on carbohydrate counting, label reading, and meal planning Incorporating physical activity into daily routines
Follow-up	Regular appointments to monitor progress, provide ongoing support, and reinforce key concepts
Outcome	Improved understanding of diabetes self-management principles, better glycemic control, decreased hyperglycemic episodes
Patient Feedback	Increased confidence in making healthier food choices and managing diabetes effectively

Case Study 2: Patient with Acute Myocardial Infarction (AMI)

Characteristic	**Description**
Demographics	60-year-old male
Medical History	Hypertension, hyperlipidemia, obesity, history of acute myocardial infarction (AMI)
Presenting Complaints	Chest pain, shortness of breath
Intervention	Individualized cardiac rehabilitation program
Program Components	- Supervised exercise sessions - Dietary counseling focused on heart -healthy eating patterns - Smoking cessation support - Stress management techniques - Medication management education

Follow-up	Regular follow-up appointments to monitor cardiovascular health, weight, blood pressure, and lipid profile
Outcome	Significant improvements in cardiovascular fitness, weight reduction, blood pressure control, and lipid profile
Patient Feedback	Successful adoption of a heart-healthy lifestyle, adherence to prescribed medication regimen, improved quality of life

These case studies illustrate the importance of tailored intervention programs in managing chronic conditions and improving patient outcomes

Discussion

A sensible strategy to delay the onset of chronic diseases is to follow the Mediterranean diet, which is defined by a high intake of fruits, vegetables, cereals, legumes, and fish; a moderate intake of dairy products, eggs, and red wine; and a low intake of animal fats and red meat and this corelates with the 6 studies **(De Lorenzo et al.,2010; Di Renzo et al 2014; Fabrini et al.,2015;Di Danielle et al., 2017; Noce et al 2021).**

An ideal daily intake of antioxidants, such as vitamins and polyphenols, has been shown in epidemiological studies to be able to prevent the onset of chronic diseases and to slow their progression **(koch.,2019).** Foods, drinks, and agro-industrial waste products made from plants contain a diverse and complex group of compounds called polyphenols. These bioactive molecules have significant physiological effects that help prevent a number of chronic diseases.

After a one-year follow-up, it is suggested that combining diet and exercise in interventions may result in better weight loss maintenance outcomes than diet-only interventions. A meta-analysis was carried out by **Lourenco et al**.,**2005** to investigate potential differences in outcomes between diet-only and diet + exercise combined interventions after a year of unsupervised follow-up. They excluded studies with exercise-only interventions and studies involving pharmacological approaches, but they included studies with diet + exercise combined interventions. Percentage WL, which was defined as WL following the intervention or after a year of follow-up/baseline was used to compare the results.

A randomized trial was carried out by **Brock et al.,2010** to assess the impact of exercise on WL maintenance. They enlisted 208 women, ages ranging from 21 to 46 years, with BMIs between 27 and 30 kg/m−2. All participants were required to adhere to an 800-kcal standard food-based diet provided by the research team during the active treatment phase, or until they reached a BMI of less than 25 kg/m−2 (M = 154 +/- 61 days). When compared to the AE non-adherers, weight gain among adherers in aerobic exercise groups was noticeably lower. During active treatment, adherence to a moderate volume of exercise (about 80 minutes/week) prevented weight gain during a one-year weight maintenance period.

A meta-analysis was carried out by **Nicholes et al,.2015** to investigate the impact of a walking program on cardiovascular disease risk factors in a population that is not physically active. 32

RCTs were chosen based on the following criteria: The trial needs to meet certain requirements: (i) it should last for at least four weeks; (ii) it should involve participants who are sedentary but in good health; (iii) at least one group should only receive a walking intervention; and (iv) it should record cardiovascular disease-related risk factors before and after the intervention. Participants in the 32 chosen references ranged in age from 30 to 83 years, the mean duration of the interventions was 18.7 weeks, the length of each session varied from 20 to 60 minutes, and the frequency of the interventions ranged from 2 to 7 days per week. The intensities of physical activity (i.e. walking) varied from light to vigorous.

To our review we found that Good life style of diet and physical exercise decrease the risk factor of chronic disease and concerning CHD risk factor is reduced in agreement of our point of view in the studies of **Moss.,2009; McGuire etal. 2007).**

A key component of diabetes care is lifestyle modification, which includes MNT, exercise, quitting smoking, counseling, psychosocial support, and assistance with diabetes self-management education.

Medical nutritional therapy encourages healthy eating habits that place an emphasis on a range of nutrient-dense foods at sensible quantities in order to achieve and maintain a healthy body weight, as well as to meet personal glycemic control and lipid targets to postpone or avoid complications from diabetes. It is not recommended for all diabetics to consume the same proportion of calories from fat, protein, or carbs. Diets like the Mediterranean and other plant-based diets are advised **(Grundy et al.,2006)**

According to recent estimates, 30% of adult women and 40% of adult men in the United States are overweight (body mass index [BMI] 25–30 kg/m2**) (Flegal et al.,2016).** Approximately 35% of men and 40% of women are estimated to be obese (BMI ≥30 kg/m2). Severe obesity (BMI ≲35 kg/m2) makes up about 16% of the obesity category **(National Center for Health Statistics.,2016).** These prevalence rates raise serious concerns for public health because they demonstrate the link between excess body fat and a number of chronic illnesses, including cardiovascular disease (CVD). The Obesity Society, the ACC, and the American Heart Association released new guidelines in 2013 to aid physicians in treating obesity more successfully **(Jensen et al.,2013).**

Conclusion:

In conclusion, the systemic review on the "Impact of Nutrition Education Programs on Chronic Disease Prevention: A Collaborative Study Integrating Nursing, Epidemiology, Family Medicine, and Nutrition Perspectives" underscores the significance of multidisciplinary approaches in addressing chronic disease prevention through nutrition education, walking and aerobic exercises with proper diet programs, guidelines for healthy style and data included from previous studies

Through a comprehensive analysis of existing literature, this review highlights the effectiveness of nutrition education programs in promoting positive health behaviors and preventing chronic diseases like diabetes, CHD and obesity. By empowering individuals with knowledge and skills to make healthier dietary choices

Furthermore, the review emphasizes the importance of interdisciplinary collaboration in designing, implementing, and evaluating nutrition education initiatives. By leveraging the expertise of diverse healthcare professionals, including nurses, epidemiologists, family physicians, and nutritionists, these programs can be tailored to meet the unique needs of diverse populations and communities. However, the review also identifies areas for further research and improvement. Future studies should focus on elucidating the long-term impact of nutrition education programs on health outcomes, as well as exploring innovative approaches to enhance program effectiveness and reach underserved populations. Additionally, rigorous evaluation methods and standardized outcome measures are needed to ensure the quality and comparability of findings across studies

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