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Impact of a natural juice based on purslane (*Portulaca oleracea* L.) on glucose levels in people living with type II diabetes mellitus: A proposal for further research

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ABSTRACT

The purpose of this project is to provide people living with Type 2 Diabetes Mellitus with a low-cost and therefore accessible dietary alternative, as a strategy to improve their quality of life in the face of this chronic, non-communicable epidemic disease. The objective is to evaluate the impact of a natural purslane (Portulaca oleracea L.) juice on glucose levels in people living with Type 2 Diabetes Mellitus through a quasi-experimental study and symptom monitoring during the intervention. Statistical analysis will allow for the development of strategies to improve their health status through nutrition.

Keywords: *Type 2 Diabetes Mellitus, purslane juice, nutrition, health status, portulaca oleracea diabetes study.*

Introduction

Type 2 diabetes mellitus is currently a major public health problem; it has increased at an alarming rate both globally and in our country. It is estimated that the number of cases continues to rise, and mortality associated with this condition is among the leading causes of death in our country. The economic burden of this disease is very high, affecting both healthcare systems and patients and their families [1]. In addition, type 2 diabetes mellitus is associated with multiple chronic complications, including cardiovascular diseases, nephropathy, neuropathy, and retinopathy, which significantly impact the quality of life of those affected. These complications are closely related to poor glycemic control and the presence of modifiable risk factors [2] [3]. Although various pharmacological treatments are available, their effectiveness is often limited due to low treatment adherence and the persistence of unhealthy dietary habits. In this sense, nutrition plays a fundamental role in both the prevention and management of the disease, representing one of the main non-pharmacological strategies for diabetes control [4] [5].

On the other hand, widespread marketing on social media promotes "miracle" products, contributing to misinformation and making it more difficult for individuals to adopt evidence-based practices [5]. Furthermore, there appears to be a lack of awareness regarding certain foods with potential beneficial effects on glycemic control. It is important to highlight that purslane (Portulaca oleracea L.) has been shown to have a positive effect on type 2 diabetes mellitus and systolic blood pressure [1], which could contribute to improving the health of individuals with this condition. This plant contains bioactive compounds with antioxidant and anti-inflammatory properties that may support metabolic control [6] [7] [8]. Furthermore, individuals with this condition do not always have the support of a family member [2] [3], a situation that reduces the likelihood of maintaining a controlled diet based on the hypoglycemic effect of certain foods [4] [5]. Lifestyle factors precede the development of diabetes [6], and other health problems are associated with diet, such as overweight, obesity, and metabolic syndrome [4].

Altogether, these elements highlight the need to develop accessible, nutrition-based strategies that contribute to glycemic control and improve the quality of life of people living with type 2 diabetes mellitus.

Background

Given its results in rats regarding improvements in glucose, cholesterol, and triglyceride levels, this provides further evidence of the potential to use purslane juice as a hypoglycemic food; it could even be used in the form of a tincture made with ethyl alcohol. However, from a nutritional standpoint, it is more important to consume it as a natural juice[6]. *Portulaca oleracea L*. (Portulacaceae) may also be useful in preventing or reducing cardiovascular disease[7]. This therapy, viewed as an alternative [8], represents an area of opportunity for the nutritionist's therapeutic work in the context of T2DM. Previous studies indicate effects on diabetes and inflammatory processes; furthermore, it has been found that it could be an alternative treatment for this disease [8], including its antioxidant activity and inhibitory effects on metastasis, liver cancer, and cervical cancer. [9] [10] [11].

Problem statement

Type 2 diabetes mellitus is closely linked to social determinants of health in the Mexican population. Economic limitations often lead to the consumption of low-cost, energy-dense foods high in carbohydrates and fats, as well as processed products rich in sugars and additives, contributing to obesity and, consequently, T2DM [4] [5] [12] [13]. Given the high prevalence, incidence, and mortality associated with this condition, it is crucial for health professionals, including registered dietitians, to identify effective and accessible strategies for glycemic control. Therefore, the following research question is proposed.

This project arises from the following

Research question

What is the impact of a natural juice made from purslane (*Portulaca oleracea L.*) on the glucose levels of people living with Type 2 diabetes mellitus?

General Objective

To evaluate the impact of a natural juice made from purslane (*Portulaca oleracea L.*) on glucose levels in people living with type 2 diabetes.

Specific objectives

- Describe the procedure for preparing purslane (*Portulaca oleracea L.*) juice for administration to people living with type 2 diabetes mellitus.
- Characterize people living with type 2 diabetes mellitus based on their sociodemographic variables.
- Determine fasting blood glucose levels at the beginning and end of the study in individuals living with type 2 diabetes.
- Compare blood glucose levels at the beginning and end of the intervention using a statistical test to determine whether there is a significant difference.
- Analyze symptom perception as captured by the symptom perception survey regarding the consumption of purslane juice (*Portulaca oleracea L.*).

Rationale

Magnitude of the problem

Diabetes is a disease that has become a chronic epidemic; its global prevalence is concerning, and in Mexico it stands at….his disease has a significant economic impact on families and individuals; its high cost to the healthcare system leads us to seek low-cost alternatives that are accessible to everyone, since purslane (*Portulaca oleracea L.*)is easy to obtain during the rainy season, this plant grows in almost every field across our country [20] [21].

Vulnerability

Type 2 diabetes mellitus affects both men and women, whether due to genetic factors or the presence of risk factors such as being overweight or obese, high-calorie diets, foods high in fat and sugar, prolonged fasting, socioeconomic conditions [14], and lifestyle factors [12] [13]. Addressing this requires a focus on health education [15]. Those living in poverty, including older adults, are equally likely to develop this disease, a situation exacerbated by the COVID-19 pandemic [16], which some patients experience in isolation, meaning they lack a family member or caregiver [2] [3].

Significance

This project represents a strategic approach to improving the health of people with type 2 diabetes mellitus; it is here that the nutritionist must focus on research as a healthcare professional committed to improving the quality of life for those in need. It is essential to note that this project would contribute new knowledge, and its results could serve as a barrier against the COVID-19 pandemic, as obesity, diabetes, and hypertension be comorbidities that put lives at risk in the face of COVID-19 [2] [13] [15] [17]. It is important to consider that if *Portulaca oleracea L.* improves glucose, cholesterol, and triglyceride levels and also helps lower systolic blood pressure, this project could assist people during the COVID-19 pandemic by reducing its impact on both morbidity and mortality, making it a significant project.

Feasibility

This project is feasible, as the costs are not significant; the researcher will cover these costs. I take full responsibility for carrying it out professionally, under the guidance of faculty members at my institution [Autonomous University of Durango] and other healthcare professionals who have encouraged me to undertake this project.

Methodology

A quasi-experimental study will be conducted; we need approximately 30–40 people who are willing to participate in the study. This means that glucose levels will be measured at the beginning and end of the study. The intervention will last one month and consists of providing a serving of purslane juice (*Portulaca oleracea L.*) Monday through Friday to people living with Type 2 Diabetes Mellitus, with or without pharmacological or any other type of treatment. A call for participants will be posted on social media to inform residents of Téllez Hidalgo about the project. Statistical analysis will be performed using SPSS-23 software, including descriptive statistics, means, and hypothesis testing.

Selection criteria for study participants.

Inclusion criteria

- Have been diagnosed with Type 2 Diabetes Mellitus
- Agree to participate after signing the "Informed Consent Form"
- Whether or not currently receiving medication or any other type of treatment.
- Complete the weekly symptom follow-up survey "How have you been feeling?" for 4 weekends.

Exclusion criteria.

- Does not have a diagnosis of Type 2 Diabetes Mellitus
- Refuses to participate after signing the "Informed Consent Form"
- Fails to complete the weekly symptom follow-up survey "How have you been feeling?" for 4 weekends.

Elimination criteria

- Failure to complete the purslane juice intake sessions
- Failure to complete any of the symptom follow-up surveys.

Symptom Monitoring Tool

The purpose of this survey is to collect information that is confidential (please sign the informed consent form) that will be used in a follow-up survey to assess how you have been feeling. This data will be used for statistical analysis as a key component of the project. Please answer the following questions honestly:

Sociodemographic variables

Place of residence (please indicate the municipality or town where you live)

Age: in full years

Gender: male/female

Education: What is your highest level of education?

Marital status: Married, single, divorced, widowed, in a common-law relationship.

Socioeconomic status

What socioeconomic status do you consider yourself to be in?

Upper class Middle class Lower class (poverty) Very low (extreme poverty)

How long ago were you diagnosed with Type 2 Diabetes Mellitus?

Do you monitor or follow up on your condition with a doctor?

Is there someone in your circle who keeps an eye on you?

Do you know which foods you can eat freely?

Which foods can affect your glucose levels?

Are you undergoing any medical treatment for your condition?

Do you use or have you used any other type of treatment? YES or NO.

If your answer is YES, what type of treatment?

What foods help improve your condition?

Have you eaten purslane?

How have you been feeling now that you're drinking purslane juice?

Have you noticed any changes in any of the symptoms you had before drinking purslane juice?

Have you experienced any discomfort from drinking purslane juice?

What did you eat yesterday?

Do you use any products to help control your glucose levels? Which ones?

Do you check your glucose daily? Or how often?

What is your average glucose level from Monday to Friday?

Record your weekend glucose level.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Artificial Intelligence

The authors declare that no artificial intelligence was used in any of the sections.

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