**WOX7001**

**RESEARCH METHODOLOGY**

**INDIVIDUAL ASSIGNMENT (10%)**

**Assignment 1**

**RESEARCH TITLE:**

**WEACHER TRE IS SUTIABLE FOR ALL AGES**

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# Research Title:

# Weather TRE is suitable for all ages

# Introduction (Research Background)

With the improvement of people's quality of life, the obesity problem has become a serious trend year by year. By 2021, about 40% of the U.S. population is already obese. Obesity is often accompanied by physical abnormalities such as increased blood pressure (BP), impaired glucose tolerance, and dyslipidaemia. (World Population Review, 2022)In medical terms, these chronic diseases can be thought of as the same type of disease known as Metabolic Syndrome (MS). Poor Eating Habits (PEH) are now linked to increase the risk of MS diseases. PEH includes under- or over-eating, not having enough of the healthy foods people needed every day, or consuming too many types of foods and drinks, which are low in fibre or high in fat, salt or sugar. (SA Health, n.d., 2022) Such as irregular diets, high-calorie Western-style meals, sedentary lifestyles, and chronic insomnia and so on. (Crose et al., 2021)

In the past, people have to take medication to prevent and alleviate some of the diseases caused by MS. Drug therapy is often accompanied by increased renal burden which may short people’s life. Extensive evidences and literature researches proposed that MS is also closely related to people's circadian clock (CC). (Phillips et al., 2021) Therefore, some medical experts proposed a method to reduce the effects of PEH and CC. They suggested people can adjust the body's metabolism by adjusting the meal time. By adjusting meal times, people can delay and reduce their risk of suffering MS. They call the method Time-restricted eating (TRE).

TRE has become a very popular method for improving the people's metabolism in recent years. TRE refers to a method that restore circadian rhythm and improve metabolic mechanisms by shortening the time people eat each day and do not limit the foods type people eat. That is, extending the daily fasting time.(Światkiewicz et al., 2021) For example, the original participants had breakfast at 6 am and dinner at 6 pm. Through the improvement of TRE method, breakfast time will be delayed by 2 hours and dinner time will be advanced by 2 hours. Which means the participant’s eating time in a day was 12 hours in past, and for TRE window time it decreases to 8 hours. TRE window defined as the time interval during a day in which 95% of all calorie-containing ingestion events occur.(Wilkinson et al., 2020) The eating time will be increased from 12 hours to 16 hours. The participant then had 16 hours of metabolic dormancy in their daily life.

The foods people eat are affected by circadian rhythms in people's bodies. Eating late at night or early in the morning can disrupt sleep cycles. (BBC News, 2021) For example, every night people’s body is trying to make the sleep hormone melatonin. The sleep hormone melatonin will stop the body from releasing insulin, and if people eat without the help of insulin, the fat and sugar may stay in people’s blood for a long time. So, it will increase the risk of diabetes and cardiovascular disease.

In fact, clinical trials have shown that TRE has a significant ameliorating effect on MS diseases. However, some experts have raised some controversies that TRE may face. Firstly, most of the current TRE clinical trial subjects are adults aged 18-60 and they body already faced MS diseases issues. This makes some of the effects of TRE on the prevention of MS a theoretical inference and difficult to prove. Secondly, underage children are in the period of growth and development, and they need supplemental nutrition to promote growth and development. If TRE is used to control underage children, will it affect their ongoing development? Also, will the use of TRE cause the elderly people to suffer orthopaedic diseases such as calcium deficiency?(Lobene et al., 2021) In the end, physical fitness varies from person to person which may be greatly affected by age. Therefore, people of different ages need to participate in different TRE time management methods. (Schuppelius et al., 2021)For example, does the child TRE window need to be extended? Does the TRE window need to be shortened year by year as people age?

# Research Problem Statement

The age of patients with obesity, diabetes, cardiovascular disease, etc. is getting younger by the improvement of the quality of human life. Time-restricted eating (TRE) has been researched and there is evidence that it is one of the effective ways to prevent and improve these health problems. The effects of TRE usage may vary for different age groups. There may even be negative effects on certain ages of people.(Schuppelius et al., 2021)

# Research Objectives

The purpose of this research is to evaluate and determine the effectiveness of the TRE method in different age groups, as well as to compare its positive and negative effects. The participants mainly include four categories, minors (less than 18 years old), adolescents (19-35 years old), middle-aged (36-60 years old), and the elderly (60 years old and above). By comparing and analysing different age groups with different TRE time, it is possible to assess whether the TRE method is suitable for all age groups. If yes, explore the most suitable TRE time for different ages of people and to explore whether the TRE method can be fully popularized in a country or the world in the future, whether it can effectively reduce the prevalence of obesity, diabetes, and cardiovascular diseases in the entire geographical group. (Schuppelius et al., 2021)

# Research Questions

1. Do the participants, especially children, have changes in memory and responses?
2. Do the participants experience any adverse reactions due to time-restricted eating?
3. What are the differences in the response of the participants’ blood sugar, weight/calorie, blood pressure and other health parameters due to different ages and different eating times?

# Research deliverables

The final delivery will include statistics data on 4 different ages of participants by the influence of different TRE window, such as participants' weight, blood pressure, and blood sugar data, participants’ periodic intelligence test reports. A summary of adverse reaction feedback from participants.

# Research Significant

The TRE method has been studied and can effectively prevent obesity, diabetes, and cardiovascular diseases. This study was designed to investigate whether TRE has no side effects in people of all ages(Lobene et al., 2021). However, people of different ages have different physiques. Lifestyle and eating habits will also vary. Incorrect TRE window design may have adverse effects on people's bodies. This means that the TRE method may face the problem that it is not applicable to all age groups. All, it is crucial to explore a suitable, scientific method for designing TRE windows based on the data. The contributions of this study are mainly concentrated in two parts. The first is to aggregate subject data from different researchers. Secondly, after data pre-processing, parameters that have little influence on the TRE effect will be excluded, so as to finally explore the TRE window time design method or algorithm suitable for different ages.

# Research Motivation

Obesity, diabetes, and cardiovascular diseases are getting younger today. The TRE method has been studied to effectively prevent these chronic diseases. (Światkiewicz et al., 2021)The motivation for this study is first to further confirm whether TRE is suitable for a comprehensive rollout across all ages of people. Second is to help people prevent chronic diseases such as obesity, diabetes, and cardiovascular diseases through health science method as much as possible. Moreover, it helps to assess the optimal TRE timing for both recessive and dominant patients. Lastly, the comprehensive promotion of TRE can reduce the burden of long-term drug control of diabetes and cardiovascular diseases on the kidneys of patients, and prolong the overall life expectancy of human beings.

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