



The effect on patient knowledge and readiness to change of a brief online asynchronous
Nutritional Education Program.

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Abstract

Background: Overweight and Obesity is defined, according to the CDC, as a weight higher than what is considered healthy for a given height (CDC, 2021). This is calculated using a screening tool for overweight and obesity. Overweight is regarded as a BMI of 25-30, and obesity is greater than 30. The latest data shows that adult overweight and obesity is increasing and has become a major global epidemic. Overweight and Obesity is a very complex health issue that has resulted from a combination of factors, including behaviors. This includes poor dietary patterns and inactivity. Lack of education in healthy nutrition is one of the issues contributing to overweight and obese adults. Other reasons can be psychosocial barriers that can include fear of judgment and uncertainty about the process of seeking help if one is obese. Other obstacles can consist of time commitment and the cost of programs. Being overweight and obese can lead to increased health risks like diabetes, heart disease, stroke, and certain cancers. According to the CDC, obesity is also associated with the leading causes of death in the United States (CDC, 2021). With this comes a significant economic impact as well. This small pilot study used participants in a brief online asynchronous. The criteria were people ages 18-65. Each volunteer participant gave written consent to participate and be evaluated during the program. Each volunteer participant answered the preprogram questionnaire, watched the virtually based PowerPoint presentation linked under YouTube, and then answered the same questionnaire to assess their new knowledge and willingness to change to a healthier lifestyle. The General Nutrition Knowledge Questionnaire was the tool used for evaluation. This questionnaire is a valid measure of nutrition knowledge that is consistent and reliable.

There were 29 participants in this small pilot study. Of the 29 volunteer participants, 21 were women, and 8 were men. All 29 took the pre-test questionnaire, and 25 completed the entire program. The average score in the pre-test questionnaire was 13.9, and the average in the post-test questionnaire was 23.5. Virtual education programs can have a positive effect on increasing one's knowledge base. This small sample pilot study concluded that online educational programs for nutrition could increase nutritional knowledge amongst men and women adults.

Introduction

PICO Question

The following question guided the literature review that supported the project: Is there an increase in nutrition knowledge and commitment to change following an online virtual Nutrition Knowledge Education program?

Problem description

Over one-third of the adult population in the U.S are obese. According to Healthy People 2030, that's 2 in 5 adults (Healthy People, 2030). Obesity is multifactorial and is a very complex health issue that has resulted from a combination of factors, including behaviors. This includes poor dietary patterns and inactivity. Lack of education in healthy nutrition is one of the issues contributing to overweight and obese adults. Being overweight and obese can lead to increased health risks like diabetes, heart disease, stroke, and certain cancers. According to the CDC, obesity is also associated with the leading causes of death in the United States (CDC, 2021). Lifestyle is one of the most critical determinants of health (Banos, 2015). This brief educational intervention is an educational program that is brief but informative and aims to increase knowledge in a particular area, in this case, general nutrition. General Knowledge Nutrition Questionnaire: An instrument tested for reliability and validity as an accurate measurement method for nutritional knowledge. Participants: adults over the age of 18. Readiness to change: An individual with an intent to change their behavior.

Overweight and Obesity are defined, according to the CDC, as a weight higher than what is considered healthy for a given height (CDC, 2021). This is calculated using a screening tool for overweight and obesity. Overweight is regarded as a BMI of 25-30, and obesity is greater than 30. The latest data shows that adult overweight and obesity is increasing and has become a major global epidemic (2015). Since most communicable diseases are controlled in Western countries, current health problems are related to behavioral variables, and most conditions are significantly influenced by lifestyle (Banos, 2015). Important causes of mortality include consuming fatty, fast, highly processed foods and a sedentary lifestyle. Other factors include alcohol consumption, smoking, and higher stress levels, especially chronic stress. Obesity and being overweight are considered health problems due to their multiple negative consequences and high costs. Although there can be other factors, evidence points to diet, physical activity, and lifestyle changes are crucial for treating this disease (Banos, 2015).

The effects of obesity impose a tremendous financial burden on health care systems. 8-10 percent higher medical care costs among individuals with obesity have been found for various U.S. subgroups across various data samples using several different research methods (Cawley, 2021). Studies have also seen increased health care costs associated with obesity and increasing BMI. So, the larger the BMI, the higher the price. According to Cawley, studies found that per-person direct medical costs of obesity were more than six times greater than those for overweight, costing more than \$114 billion (Cawley, 2021). There was also a 3-fold increase in medical costs from class 1 to class 3 obesity, where each kilogram of weight was associated with a high average of \$140 billion annually (Cawley, 2021). This is such an economic burden. It is noted through various literature that low socioeconomic status can account for a large part of

obesity. When it comes down to national debt, nutritional status can have an impact secondary to cost. A lot of money can be saved when people are nutritionally sound. If people are educated in nutrition and have a knowledge base about food consumption, healthy food choices, and habits, it can significantly impact their nutritional health. Overweight and obesity, as well as their related noncommunicable diseases, are preventable with the right tools. Individual responsibility can only have its full effect where people have access to a healthy lifestyle. Therefore, at the societal level, it is essential to support individuals in following the recommendations of healthy eating and physical activity through sustained implementation of evidence-based and population-based policies that make regular physical activity and healthier dietary choices available, affordable, and easily accessible to everyone, particularly to the poorest individuals (World Health Organization, 2021).

Other factors can be time. Individuals now are extremely busy with work, life, and families. It can be difficult for some to attend in-person classes that are only scheduled at certain times during the day or evening, as well as cost. Many programs have an initial startup fee or type by class fee to attend. There can be a tremendous potential benefit to having access to a free virtual-based nutrition program that can be accessed at any time and from any internet device. This can be beneficial for families, friends, or even couples to access together and motivate each other to want to change to a healthier lifestyle. Healthy eating and exercising are essential for your physical and mental health. Healthy eating and exercising can help control your weight and prevent other diseases or illnesses. Knowing what healthy eating is and the right food choices, portions, and motivation to want to change can help reduce an individual's BMI and therefore reduce their risk of other obesity-related health conditions.

World Health Organization estimations globally indicated that over 1.9 billion adults over 18 were overweight, and over 650 million were obese in 2016 (World Health Organization, 2021). Obesity has nearly tripled since 1975, and most people live in countries where obesity kills people more than underweight people (World Health Organization, 2021).

Healthy People was created by the U.S Department of Health and Human Services to guide efforts to improve the nation's health. Their goals, plans, and data have been released by the U.S. Department of Health and Human Services (HHS) every decade since 1980; healthy People identifies science-based objectives with targets to monitor progress and motivate and focus action. Healthy People 2030 is on helping people eat healthily and get enough physical activity to reach and maintain a healthy weight. Healthy People 2030 partners and communities nationwide are striving to improve health in ways that help us move toward achieving Healthy People goals and objectives (Healthy People 2030, 2022).

Over the last several years, technology has dramatically improved. Computers, smartphones, more excellent databases, and broadband networking has given tremendous access to online and virtual services. As the world migrates to digital devices, opportunities arise for education resources to reach a broad spectrum of society (Zhang, 2019).

Available Knowledge

A study was done by instructors of Nutritional Services at Loma Linda University in California in 2018. Their objective was to determine if lack of nutrition knowledge positively impacted eating behaviors using obesity status as an indicator. Participants completed the General Nutrition Knowledge and Anonymous Demographic Questionnaire, and anthropometric

measurements were taken during a one-time meeting. There were 334 participants. The results of the study suggested that participants who were obese did have a lower level of nutrition knowledge. There is a potential benefit to implementing nutrition intervention during this obesity epidemic (Keay, 2018).

A study at Tamale University aimed to determine the influence of nutrition knowledge and dietary practices on nonacademic staff. They wanted to see if poor nutrition knowledge resulted in poor dietary patterns and nutritional status. The conclusion was that there was a high prevalence of good nutrition knowledge, and most had moderate dietary diversity after receiving nutritional education.

According to (Banos, 2015), studies reviewed that used technology-assisted weight loss interventions specifically proved in primary care settings showed that they helped patients achieve significant weight loss. This gave patients the option to undergo semi-remote interventions. In summary, internet-based interventions are becoming promising tools to promote a healthy lifestyle in people who are overweight or obese. A study done by staff at a hypertension unit in a public hospital evaluated patients with hypertension and internet-based interventions. The study aimed to develop and test a completely self-administered virtual program to promote healthy habits, including healthy eating and exercise, in hypertensive patients. Unfortunately, this trial is still going on, so results/conclusions were not accessible. However, other studies with similar objectives have proved to be highly effective in chronic disease populations. With the above factors in place, individuals must have greater access to information regarding healthy nutrition, healthy eating, and ways to accomplish a healthy lifestyle. Having a virtual-based nutritional knowledge program would be beneficial to the

various populations. The program is in PowerPoint formation with voice narration. It includes all aspects of nutrition, from education on multiple foods, healthy food choices, portion sizes, and pictures. Also included in the program is a summary of the importance of getting plenty of exercise and examples that can be used. The program is encouraging to the audience, and its goal is to provide not only nutritional knowledge but the individual's goal of commitment to change.

As stated under the specific aim section, this virtual program is aimed at women. The purpose of a study done by dietitians at the University of Sydney and Charles Sturt University was to gain some insight into the barriers that influence women and to explore effective recruitment methods from the perspective of women with obesity living in both urban and regional areas. Semi-structured interviews were used to elicit information from focus groups. The results of the study using a multitude of questions were multifaceted. What they discovered was that the barriers were psychosocial and physical. The significant barriers were the fear of judgment of what others may think and the physical barriers, i.e., cost, time commitment, and access to programs. Physical and virtual recruitment methods were identified as potentially effective, provided they have been presented in media that this group is likely to use and can access in a private location (Crino, 2019). This study provided a greater understanding of the challenges women face.

A study by the Department of Human Nutrition at the University of Otago in New Zealand aimed to develop and test the effectiveness of an online nutrition education resource for people with pre-and type 2 diabetes to empower them to make positive dietary choices and commit to a healthier lifestyle. This assessment was conducted by ethnic-specific discussion groups and followed by a population-based survey. The educational resource included a pre-

questionnaire, an educational video followed by a post-questionnaire. There were 156 participants. The results showed a strong desire to learn nutrition through simple online educational resources; participants expressed intentions to make positive dietary and lifestyle choices. The research showed that electronic nutrition education resource was an effective means for delivering education.

A study was done by researchers on students and employees at Oslo Metropolitan University in Norway. They wanted to determine whether there was a gender difference in nutrition literacy levels. According to Svendsen, there is a well-known social gradient of cardiovascular disease risk (CVD), where individuals with low socio-economic status display the highest risk factors for CVD compared to those with high socioeconomic status (Svendsen, 2021). According to Berkman, health literacy has been defined as the degree to which an individual can obtain, process, understand and communicate health-related information needed to make informed health decisions (Berkman, 2020). The study involved 548 students and employees. A questionnaire with two parts was included in the study. The questionnaire covered age, gender, body weight/height, smoking habits, cholesterol levels, and physical activity. It also covered Nutrition Literacy using the Norwegian NL questionnaire. Their conclusion found that the university students and employees appeared to have a relatively high nutrition knowledge and the predictors of the high NL were women.

Of note, limited studies were found regarding virtual nutrition education programs and outcomes, as well as investigations involving men in nutrition knowledge.

Rationale

This program evaluation uses the Transtheoretical model (TTM) as its framework. This model explains the individual's readiness to change their behavior. It breaks down the states of individual change into six steps. The first level is Pre-contemplation when the individual has no intention of taking any action. Second, the individual begins to Contemplate changes and plans to do so shortly. The third level is Preparedness to act. The fourth state is Action, when a behavior has been changed for a short period. The 5th level is Maintenance when a change has been followed for the long term. Finally, Termination is when the individual no longer wishes to return to earlier, less healthy habits. The brief educational intervention will promote the change from the pre-contemplative or contemplative level of this framework with and goal of moving patients to preparedness by giving and reinforcing nutrition information in a simple way that allows them to make concrete goals for change. Over time it is hoped that with additional intervention or their action leading to success, they will work towards maintenance and then terminal change. One short program is just a starting point to help them along the path to a healthier diet. Some researchers working with obese or pre-obese women have concluded that: "We can suggest that personal or group education based on TTM should be provided to this so-called pre-obese group, especially by nurses working in primary care to prevent obesity and researchers who work in this field should follow up the effects of behavior change interventions for longer terms (12-24 months)" (Baysal, 2017).

Specific Aims

The target project population is adults 18-65. This program can essentially be used for any people looking to gain nutrition knowledge and are ready to change. A virtual program is essential to reaching out to populations that may be busy and have time constraints and prefer to have access to this in the comfort of their own home. The program is free and can help where financial difficulties may lie.

Methods

Context

This educational intervention is an educational program that is brief but informative and aims to increase knowledge in a particular area virtually to reach individuals that can't or do not want to participate in such programs in person. The overall goal of this program is to increase health and nutrition awareness and the drive to want to and omit to change to a healthier lifestyle.

Intervention

Participants will be asked to complete a General Nutrition Questionnaire in sections two and three. Has “been shown to be a measure of nutrition knowledge that is consistent, reliable, valid, and sensitive to changes in knowledge. The sections can be administered individually and give valid and reliable results for specific areas of nutrition knowledge” (Kleinmann et al. 1 2016). This is public domain and is reliable and valid. The use of sections alone rather than the whole survey has also been validated. The final additional questions are readiness to change questions (Beasley et al. 2021) to evaluate motivation change in the participants. The consent will be sent with the YouTube educational program; the survey will acknowledge the participant's permission in the pretest. The program will be available even if they do not participate in the pre-survey. Participants will be asked to complete the post-survey after reviewing the educational program and YouTube link to watch the Nutritional Knowledge PP. Once this is achieved, they will complete the Questionnaire again. The post-program questionnaire will include questions regarding their commitment to wanting to change and use

what they learned to switch to a healthier lifestyle. After data collection, they will receive the answers to the questionnaire so they can have a complete guide to nutrition knowledge. This project is a program evaluation with an educational intervention. The Except consent will be used before the participants complete the survey information. They will either not complete the survey if they decline based on the support or will answer the first survey question that they do consent to the study. If a survey is conducted, but the consent question is answered in the negative, it will be discarded. There is no coercion since the program is available regardless of the consent or survey results.

Study of the Interventions/Measures

The approach chosen to assess the intervention's impact is the survey method at the end of the post-questionnaire, asking about participants' readiness for change. The technique used determined overall outcomes were the General Nutrition Questionnaire. This method allowed the study to see the results and knowledge of the participants before the online Nutrition education program and the scores and outcomes utilizing the post questionnaire.

Analysis

There were no qualitative questions asked. The educational module and pre-and post-questionnaires were implemented online. After the completion of the program, responses were reviewed. The data collected from surveys were transferred to Excel for statistical analysis. This intervention and survey's data analysis showed a significant increase in nutrition knowledge post-program. It also increased participants' willingness to change based on standard procedures

change theory. Implementing an asynchronous learning module will allow other education programs to be implemented virtually, knowing it has the potential to be successful.

Ethical Considerations

This research study was reviewed and approved by the Edinboro University IRB. Participants were informed that they were not obligated to participate in the questionnaires or online education program and may elect to stop participation at any point during the session. Additionally, participants were not asked to provide any personal identifying information. Questions were broad in scope and nature to prevent any ethical or moral conflicts the respondents may face when completing the questionnaires. This study posed no ethical threats, nor did it harm participants or manipulate participants in any way.

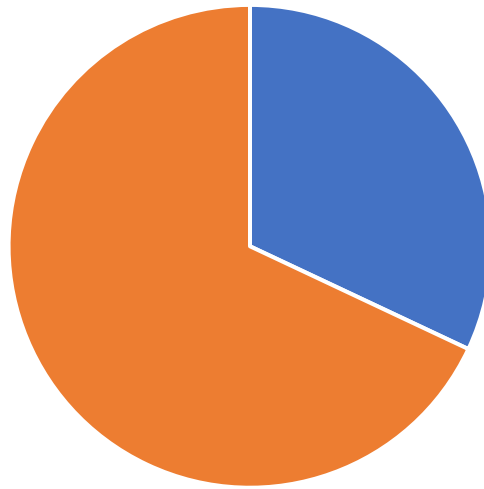
Results

Overall results showed significant improvement in nutrition knowledge after watching the Nutrition 101 online program. There were 29 participants in this small pilot study. Of the 29 volunteer participants, 21 were women, and 8 were men. All 29 took the pre-test questionnaire, and 25 completed the entire program. The average score in the pre-test questionnaire was 13.9, and the average in the post-test questionnaire was 23.5. Interesting enough, the lowest scores on the pre-test that had the most significant increase in correct scores in the post-test were the questions related to alcohol, fruit juice, and suitable choices for eating out. This can be substantial knowledge for people when knowing what healthy food choices to pick from when dining out and the maximum number of alcoholic drinks recommended daily. The one question that scored high on both pre and post-test was asking how many times per week people should

eat breakfast and whether experts recommend more, duplicate, or less sugar intake in a day. Most had the correct answer: breakfast should be consumed daily, and sugar intake should be less.

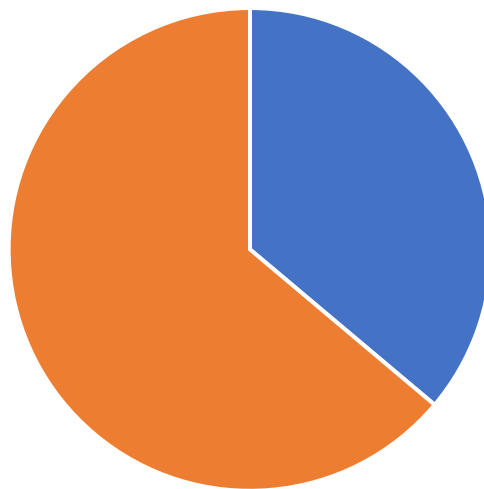
Results of the intention to change the survey question, which was added to the General Nutrition Survey as numbers thirty-four and thirty-five, showed no change. The people surveyed did report a high at 6.57; in the post-survey, this was much higher at 8.65. This supports that even short-term online education may increase patients' confidence in making healthy choices and intended change. For question thirty-four, "*On a scale of 1 to 10 stars, how do you feel about making healthy choices on a scale of 1 (not ready to change) to 10 (already changing) that they were changing since several of the people surveyed reported they were making changes immediately.*" The results of question thirty-five further supported this, "*On a scale of 1 to 10 stars, how likely is it that you will be making healthy changes in your lifestyle*" With 1- Not ready to change and ten being already changing again, there was a similar improvement with a change from 6.86 to 8.80 post education. The survey responses decreased in the post-survey from 29 to 25, which is a possible reason for these changes. It is possible that the less interested or motivated to change did not complete the education or post-survey, and that could account for a change with more subjects who were already motivated to seek education and make changes to their diet completing the post-survey. This could be further evaluated with larger sample size and consideration of the use of matched surveys in later evaluations of this or similar education.

Percentage of participation in Post-Questionnaire



■ Male Participants ■ Female Participants ■ ■

Average Score



■ Pre-Questionnaire ■ Post-Questionnaire ■ ■

Discussion

Summary

This brief educational intervention was intended to reach the target population of adults 18-65 and be used for any individual to gain nutrition knowledge. It promoted the change from the pre-contemplative or contemplative level, intending to move patients to preparedness by giving and reinforcing nutrition information in a simple way that allows them to make concrete goals for change. The program was designed to reach populations that may be busy, have time restraints, and want to have access to the comforts of their own home. Over time it is hoped that with additional intervention or their action leading to success, they will work towards maintenance and then terminal change. One short program is just a starting point to help them along the path to a healthier diet.

Interpretation:

Findings from this small pilot study proved to be successful. The specific aim was to reach individuals 18-65, increase their nutrition knowledge and encourage them to want to make a change for a healthier lifestyle. Greater participation would have allowed for more critical data; however, this can be implanted in further studies if one would choose to do a similar study with a larger population or more specific aim narrowed to one health factor like diabetes, HTN, etc.

Limitations

One of this study's limitations was the small sample size. Larger sample size could assess the effect of a virtual program like this. Another limitation did not know the participant's actual

age or education level. Can there be limitations for older participants vs. younger ones? People who are more educated have better learning capabilities than less educated people. Some exclusion to participation would be lack of technology. However, this was not a limitation in this small pilot study. A limit that could be considered in future larger-scale studies.

Conclusions

This brief asynchronous nutritional education program was evaluated for increased nutrition knowledge and its effect on participants' readiness to change. Both results showed an increase in the participant's nutrition knowledge post-program and increased willingness to change. Hopefully, this minor program evaluation could be repeated with a different and larger demographic group if it shows promise. The results are required by the DNP program to be submitted for dissemination in the form of a poster, presentation, or publication. The program itself will remain available as a YouTube presentation. Further studies in this field could include adolescents, a larger sample size, or could be narrowed down to only people with diabetes or heart disease.

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