Early Type 2 Diabetes Mellitus Identification Through Screening and Healthcare Provider Education Among Overweight and Obese Adults in a Rural Primary Care Setting

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THIS PROJECT IS IN PARTIAL FULFILLMENT OF THE DEGREE REQUIREMENTS FOR THE DOCTOR OF NURSING PRACTICE AT TOURO UNIVERSITY NEVADA

Overview

- **Aim**
  - To establish a preventative method for detecting the development of T2DM among obese and overweight patients at an early stage
- **Achieved**
  - Provided evidence on the efficacy of staff education in improving early diabetes screening compliance
- **Practice pearl**
  - DNP-prepared nurses are capable of effectively translating evidence into practice in order to improve health processes that contribute to the improvement of health outcomes among diabetic patients

Introduction

- **Obesity**
  - Risk factor for Type 2 Diabetes Mellitus
  - Affects insulin resistance through increased inflammation and fatty acid levels
- **Early diabetes screening**
  - Helps avoid complications
  - Promotes early treatment
  - Prevents disease progression

(Trimm et al., 2020; Wondmkun, 2020)

Background

- 34 million Americans have diabetes
- Diabetics average medical expenditure 2.3 times higher than those without diabetes
- Despite high prevalence and detrimental impact, diabetes screening rate is low at only 15%

(ADA, 2018; CDC, 2020; Happel, 2019)

Significance to Nursing and Host Site

- **Improvement in compliance to early diabetes screening leads to:**
  - Early detection and treatment
  - Reduction in number of patients treated for diabetes
  - Reduction in healthcare spending for diabetes

DNP Problem

- T2DM is asymptomatic during earlier stages
- Early detection is crucial to prevent disease progression and complications
- The project site does not conduct early diabetes screening among high-risk overweight and obese patients.

(ADA, 2018Timm et al., 2020)

Purpose Statement

- The purpose of this quality improvement project is to implement and determine the efficacy of staff education in improving early diabetes screening knowledge and screening compliance among the medical staff at a family practice clinic in Bakersfield, California

Aims and Objectives

- **Project Aims**
  - Establish a preventative method for early detection of T2DM in obese and overweight patients
  - Increase knowledge about early diabetes screening among the site's medical staff.
- **Project Objectives**
  - Implement early American Diabetes Association (ADA) diabetes screening protocol.
  - Educate the nurses and physicians about ADA's early diabetes screening guidelines at the practice site.
  - Evaluate improvement in knowledge using a pre and post early diabetes screening knowledge survey, with a goal of 90% correct answer out of 10 survey questions.
  - Increase to 100% the medical staff's compliance to early diabetes screening of obese and overweight patients.

(Nikitara et al., 2019; WHO, n.d.)

Literature Review

- **Search Methods**
  - PubMed, CINAHL, Embase, Medline, and the Jay Sexter Library were searched
  - Keyword used used : early screening; diabetes; type 2 diabetes; obesity; overweight; staff education
  - Inclusion criteria
    - Studies published in the last five years,
    - Studies with early diabetes screening as variables,
    - Studies that had staff education as one of their interventions, and studies with participants who were either diabetes
  - 20 out of 338 articles met the inclusion and were included in literature review and synthesis.

Literature Review

IMPORTANCE OF EARLY SCREENING

EFFICACY OF EARLY SCREENING

STAFF EDUCATION

PERCEIVED BARRIERS

Literature Review

- **Theme 1 - Importance of early diabetes screening**
  - Prevent disease progression (CDC, 2021; Pippitt et al., 2016)
  - Provide insights of what can happen if high-risk individuals are not screened earlier. (Ravangard et al., 2017)
  - Provide insight into the possible complications that high-risk individuals might encounter if their diabetes is not diagnosed earlier (Selvin et al., 2018).

Literature Review

- **Theme 2 - The Efficacy of Early Screening**
  - Lowered cardiovascular risk scores and mean fasting plasma glucose levels (Palladino et al., 2020)
  - Reduced risk in all-cause mortality and CVD events (Simmons et al., 2017)
  - Lower severity of retinopathy (Olafsdottir et al., 2016)
  - Improved outcomes about retinopathy and CVD, renal disease all-cause mortality (Feldman et al., 2017)
  - Delayed the onset of T2DM among study participants (by Barry et al., 2017)
  - Patients had less need for insulin, lower HbA1c levels ten years after screen detection (Vos et al., 2020).

Literature Review

- **Theme 3 – Education of Staff**
  - Only 6% of primary care providers (PCPs) were able to identify the triggers for prediabetes screening
  - Only 17% PCPs accurately identified laboratory parameters for diagnosing prediabetes (Tseng et al., 2017)
  - Education program enhanced provider confidence and knowledge in screening for renal disease among diabetic patients.
  - The average number of diabetic patients screened resulted in a net increase of 31.5% (Chubbs, 2017)

Literature Review

- **Theme 4 – Barriers to Implementation**
  - Resistance to change
    - Personality traits, job security, employee-management relationship, employee participation in the decision-making process, magnitude and complexity of the change influence a person's resistance to change (Amarantou et al., 2018; Tappen et al., 2017).
  - Time Constraints
    - Notion that the new guidelines are inefficient can lead to feelings of resentment (Busetto et al., 2018)
    - Lack of time was the top barrier to the implementation of EBP (Mallion and Brooke, 2016; McArthur et al., 2021)

Lewin's Change Theory

Understands why change must happen

Status quo is broken

Change

Transition stage or the actual implementation of the change in process

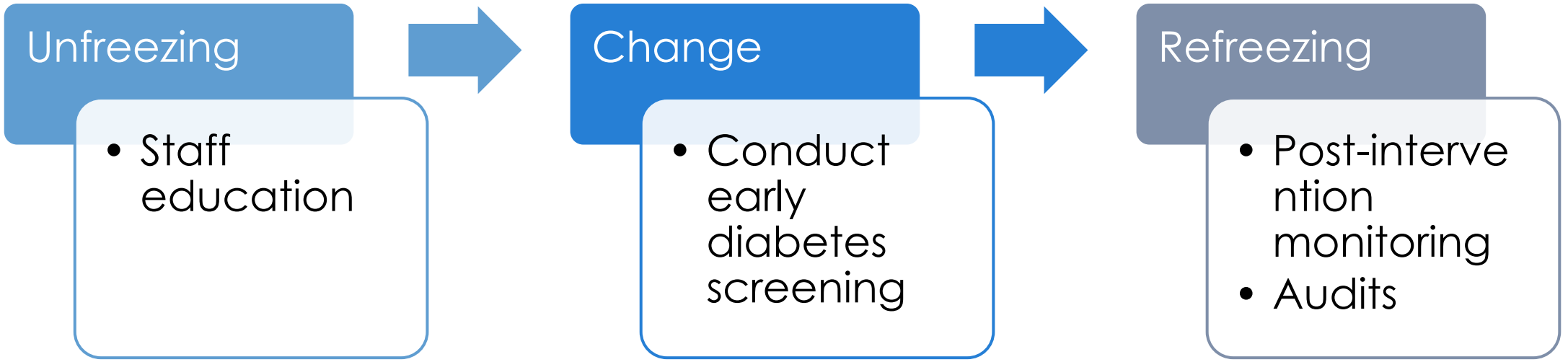
Refreeze

New habit is established as the new norm

People begin to accept the new ways of things

(Burnes, 2020; Cummings et al., 2016; Hussein et al., 2018; Udon & Wagner, 2018; Wojciechowski et al., 2016)

Lewin's Change Theory: Application to the Project



Project Design

- Setting
  - Private primary care/urgent care clinic in Bakersfield, California
- Population
  - Direct population – Physicians, medical assistants in direct contact with patients
  - Indirect population – Obese or overweight patients
- Stakeholders
  - Medical staff
  - Obese/overweight patients
  - Clinic management

Implementation

Week 1

- Sent email invitation
- Administer pre-test
- Conduct education session
- Administer posttest

Week 2

- Start of the implementation/use of early diabetes screening on qualified patients
- Provide support via email, text messages, and/or phone calls.

Week 3

- Ongoing implementation
- Ongoing support
- Conducted chart audit of previous week's charts

Week 4

- Continued implementation
- Ongoing support
- Conducted chart audit of previous week's charts

Week 5

- Collated post-test data
- Completed chart audit of previous week's chart
- Run data analysis

Evaluation

Pre-Post Early Diabetes Screening Knowledge Test

- 10-question, multiple-item survey
- Tests participant's clinical knowledge about factors crucial for early diabetes screening.

Chart Audit Tool

- Checklist to verify patient information entered in the HER and ADA prediabetes risk tool utilization

Evaluation

Paired t-test - compare the pre-and post-survey scores

Descriptive statistics - to analyze the compliance post-intervention

(Pallant, 2020)

Results/Findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MA	17	81.0	81.0	81.0
	FNP	4	19.0	19.0	100.0
	Total	21	100.0	100.0	

Table shows the number and percentage of medical staff who joined the education session.

Results/Findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9.00	3	14.3	14.3	14.3
	10.00	18	85.7	85.7	100.0
	Total	21	100.0	100.0	

Table shows the knowledge test scores

Results/Findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MA	17	81.0	81.0	81.0
	FNP	4	19.0	19.0	100.0
	Total	21	100.0	100.0	

Table shows the number and percentage of medical staff who joined the education session.

Results/Findings

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post	9.8571	21	.35857	.07825
	Pre	7.0476	21	1.39557	.30454

Table shows the paired samples statistics on the pre- and post-early diabetes screening knowledge test scores

Results/Findings

		Paired Differences					t	df
					95% Confidence Interval of the Difference			
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper		
Pair 1	Post - Pre	2.80952	1.36452	.29776	2.18840	3.43064	9.435	20

Table shows the statistical significance in the pre and post test scores

Results/Findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	61	100.0	100.0	100.0

Table shows the compliance to the use of ADA risk test

Discussion

- **Staff education was effective in increasing knowledge of health care providers.**
  - Improvement in knowledge supported the results from an earlier study by Chubbs (2017)
- **Strategies such as education and practical simulations, improved compliance among nurses**
  - The 100% compliance post-intervention validated the findings from a systematic review by Martos-Cabrera et al. (2019)

Discussion

- **Limitations**
  - A quality improvement project limited the option to have a control group
  - Small sample size
  - Short time period allotted implementation
  - Data analysis was limited by the lack of pre-intervention data for screening compliance

Conclusion

The project findings validated the efficacy of staff education in improving knowledge and compliance with early diabetes screening guidelines

Medical staff with increased awareness of early diabetes screening are more likely to

- Consistently utilize the ADA risk test
- Provide the appropriate treatment

Dissemination

Touro University Nevada the DNP project chair, the DNP project members, the DNP faculty, and the DNP students	• Oral PowerPoint presentation
Practice site medical staff and management	• Poster presentation
Other primary care clinics in the are	• Disseminate through the vast network of NPs at California Association for Nurse Practitioners
Other DNP students and graduates	• Shared with the DNP project repository

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