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Wilfrance Celestin
wcele003@fiu.edu

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Educational Intervention to Improve Cognitive Screening in Primary Care.

A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice

By

Wilfrance Celestin, MSN, APRN

Supervised By

Charles Buscemi, PhD, APRN

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Abstract

Cognitive impairment is a medical condition that requires much of the healthcare community's attention. It is a comorbidity that has multiple negative impacts on managing concomitant medical diseases and the health care industry in general. There are at least 5.8 million individuals 65 years and older living with A.D., which will be almost triple by the year 2050. Even though assessment of cognitive impairment has been a part of the Medicare annual wellness visit (AWV) since the implementation of the Affordable Care Act in 2010, cognitive impairment and dementia are under-diagnosed in primary care. According to the Alzheimer's Association Report (2019), primary care physicians state to assess only about 50 percent of patients routinely. A literature review was conducted to determine if an educational intervention in a primary care setting would improve cognitive screening rate and accuracy using the Saint Louis University Mental Status (SLUMS).

The literature review included seven articles from 2015 to 2020 on factors that cause delayed, underdiagnosis, and missed diagnosis of cognitive impairment in primary care. Most of the articles concluded that lack of training and confidence, provider educational needs are significant challenges to cognitive screening. Also, scoring errors is a significant problem that causes delayed and missed diagnosis. However, educational intervention should improve providers' and nurses' knowledge of dementia in primary care and increase timely diagnosis.

The literature review results were used to develop a quality improvement project to improve staff's cognitive screening accuracy, knowledge, and confidence using the SLUMS. The literature review was also used to create an educational intervention, and a pretest and posttest questionnaire was developed to assess the effectiveness of the intervention. A Letter of recruitment was emailed to all potential participants at the primary healthcare clinic. The educational

intervention was done virtually using Microsoft teams. The consent, pretest, and posttest were completed via Qualtrics. The data analysis shows an overall improvement in the average scores on the pre-and posttest after completing the educational intervention. In sum, a tool-specific educational intervention can improve cognitive screening rate and accuracy in primary care settings.

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Introduction

The older adult population in the United States (U.S.) is growing at a fast pace, and so is the prevalence of cognitive impairment associated with the aging process (Bui et al., 2020). Cognitive impairment is a complex concept that encompasses many problems in cognition. It can result from a metabolic or endocrine disorder, medication side effects, depression, and dementia (National Institute on Aging, 2020). Age is the most significant risk factor for cognitive impairment. However, family history and chronic diseases such as diabetes, heart failure, COPD, stroke, HIV, and Parkinson's Disease increase cognitive impairment risk. It is estimated that 60 % of adults in the United States (U.S) have at least a chronic disease, and 40% have two or more (Center for Disease Control and Prevention [CDC], 2020). Older adults with chronic diseases have a much higher prevalence of cognitive impairment. As a result, chronic diseases must be considered when assessing cognition (Athilingam et al., 2015).

Patients with cognitive impairment face many physical and emotional challenges that negatively affect their life. Primary care providers are uniquely placed to detect cognitive impairment in their patients (Alzhiemer's Associated, 2019). However, according to the study of Ramano et al. (2020), more than 50 % of patients with Alzheimer's disease had a delayed diagnosis. Furthermore, in a survey by the Alzheimer's Association Facts and Figures (2019), PCPs only assess cognition in about 50 % of their patients, and only 16% receive regular cognitive assessments during regular office visits.

Cognitive impairment ranges from mild cognitive impairment (MCI) to mild, moderate, and severe dementia. Cognitive impairment, at any stage, entails a memory deficit. When cognitive impairment is mild, it does not significantly impact daily living activities and may go undetectable. Dementia is a syndrome defined as memory loss with impairment of daily living (Wong, 2020).

Alzheimer's Disease is the most common cause of dementia. It is a progressive and multifocal disease associated with loss of memory and cognitive function and functional impairment (Alzheimer's Society, 2019). In Florida, the incidence of AD is expected to grow 64% from the year 2000 to 2025 (Alzheimer's Association, 2011). The number of patients with cognitive impairment, dementia, and Alzheimer's disease is growing fast. It is estimated that at least 5.8 million individuals 65 years and older are living with A.D and is expected to at least double by the year 2050. Furthermore, Alzheimer's dementia kills more people than prostate and breast cancer combined (Alzheimer's Association, 2019). The negative impact of MCI and dementia in our society makes screening for these conditions an essential part of primary healthcare.

According to the Affordable Care Act of 2010, cognitive screening must be completed during the annual wellness visit. Moreover, cognitive screening must be an integral component of a neurologic examination. Even though cognitive impairment screening is essential to improve patients' quality of life, many healthcare practices do not have an easy process for the staff to follow and no formal training on the screening tool that they use. Therefore, this doctoral project aims to develop an educational intervention to improve knowledge of cognitive screening in primary care.

Background

The 21st century has brought about many innovations in the healthcare industry, which help create new diagnostic and screening tools for early detection and management of diseases. As a result of these innovations, life quality improves, and people live longer in most developed countries. It is estimated that the population 65 years and older in the U.S. will be 88.5 million in 2050; this is more than twice the population in 2010 (Vincent & Velkoff, 2010). Consequently, the prevalence of disease associated with the aging process, such as cognitive impairment and dementia, also increases. In 2017 it was estimated that about 6 million Americans live with cognitive impairment, of which 60-80% is dementia (Brookmeyer et al., 2018).

Cognitive impairment is a medical condition that requires much of the healthcare community's attention because it is a comorbidity that has multiple negative impacts on managing concomitant medical diseases and the health care industry in general. Individuals with cognitive impairment have more frequent emergency room visits, higher admissions, and readmission rates (Perry et al., 2018).

Most people, 65 years and older, have one or more chronic diseases and are more likely to have cognitive impairment that affects activities of daily living (ADL). Also, the changes associated with cognitive impairment, such as memory loss, problems related to judgment, thinking, and language, can lead to poor disease management such as non-compliance with medication adherence (Athilingam et al., 2015). This amplifies the need for cognitive screening in outpatient settings.

Cognitive health is vital to a good quality of life and should be assessed timely and accurately. The Affordable Care Act requires screening for cognitive impairment during the Medicare annual wellness visit (AWV) to detect early cognitive decline and dementia in older adults (Silbley *et al.,* 2019). Since most patients 65 and older have a primary care provider, the

managed care organizations are uniquely positioned to create an efficient process for timely and accurate screening to improve patients' outcomes (Wong, 2020). According to the U.S. Preventive Services Task Force, 2020, early detection of cognitive impairment provides opportunities to treat underlying health conditions, talk to patients about advanced planning, and timely referrals to specialists and the community.

Literature Review

A review of the literature was conducted to assess current knowledge on cognitive impairment screening in primary care, assess the use of screening stool in practice, and finally assess educational interventions' possible impacts on improving healthcare professionals' knowledge and clinical practice. This literature review includes articles on cognitive screening tools and barriers to challenges associated with their proper use. Moreover, it includes literature on educational interventions and their benefits for medical personnel in primary care settings.

Search Strategies

The search strategy that was used to incorporate the selected seven articles is the Boolean method. This method allows the combination of operators/modifiers with keywords such as "Cognitive Impairment," OR "dementia," OR "Alzheimer's disease," AND "screening," OR "assessment," OR "detection," AND "educational interventions," OR "training," AND "barrier," OR "challenge." The keywords were entered in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and google scholar databases to gather relevant Randomized Control Trial (RTC) studies, integrative and systematic reviews primarily. The PICO question was used to guide the search and to find relevant keywords for the literature review.

The inclusion criteria for the search were developed only to include the latest and most relevant articles. Consequently, the search was limited to articles from 2015 to 2020; synonyms of keywords were allowed. The search also limits to only peer-reviewed articles and evidence-based articles in the English language. Furthermore, there was no geographical limitation, meaning peer-reviewed journals of different countries were also included. The search yields a total of 73 articles. After removing duplicates and using the exclusion criteria such as articles on management instead of screening and assessment, articles on inpatient settings, articles on screening tools, not currently validated for primary care, a total of seven articles were the most relevant for this literature review.

Validity of dementia and mild cognitive impairment tools in primary care

Razak et al. (2019) conducted a systematic review to find updated evidence on the validity of dementia and mild cognitive impairment screening tools among older adults in primary care settings. The original search for the review included 144 articles. After removing duplicates, two independent reviewers assess the articles to find the most relevant according to the study's inclusion criteria.

Screening for cognitive impairment is essential among the older adults. However, finding a proper tool that is brief, simple to use with high sensitivity and specificity is difficult (Razak et al., 2019). The study met its objectives and provided information to help healthcare providers finding appropriate tools to screen for MCI and dementia. A total of nineteen screening tools were found in 17 of the 30 articles to assess dementia in the older adult populations. The Montreal Cognitive Assessment (MoCA), Addenbrooke's Cognitive Examination III (ACE-III), Saint Louis University Mental Status (SLUMS), Rapid Cognitive Screen (RCS), and Brief Cognitive Assessment Tool (BCAT) had the highest sensitivity and specificity. However, the ACE-III had the highest sensitivity and specificity, 100% and 96 %, respectively (Razak et al., 2019). The study also entails finding the best tools to detect MCI. In the review, fourteen screening tools were found in 19 of the 30 articles to detect MCI. The MoCA was the most sensitive and specific (Sn = 81–97%, Sp = 60–86%) and was the most used. Sensitivity is the most important factor for a good screening tool to detect cognitive impairment. According to Ismail et al. (2010), even though the MoCA was the most sensitive, the Mini-Cog, the Memory Impairment Screen (MIS), or the General practitioner assessment of cognition (GPCOG) were the screening tools of choice and the most suitable for initial assessments in outpatient settings. These three tools are also part

of the cognition assessment tool kit of the Alzheimer's Association to screen for cognitive impairment during the Medicare Annual Wellness Visit (Cordell et al. 2013).

Sensitivity and specificity of brief cognitive screening tools

Contrary to Razak et al. (2019), who studied the validity of screening tools, Malmstrom et al. (2015) wanted to find a brief cognitive screening with good sensitivity and specificity. In a study by Mansfield et al. (2019), primary care providers reported that lack of time was the most common barrier to screen for cognition. As a result, many studies have been done to find brief screening tools, meaning take less than 3 minutes, and have high specificity and sensitivity to detect cognitive impairment and dementia. Razak et al. (2019), in their study, found the Saint Louis University Mental Status (SLUMS) and the Rapid Cognitive Screen (RCS) exam were among the five screening tools with the highest sensitivity and specificity to detect MCI and dementia in primary care. Malmstrom et al. (2015) studied the performance of the RCS in primary care settings. The RCS is an abbreviated version of the SLUMS exam with only three items: recall, insight, and clock drawing. It can be completed in less than three minutes. In the article, Malmstrom et al. (2015) conducted two studies to assess the sensitivity and specificity of the RCS to detect cognitive impairment and dementia on the DSM and the SLUMS, compare the RCS to the clock drawing test plus recall (CDT). Finally, they assess the RCS's predictive validity for nursing home placement and mortality (Malmstrom et al., 2015).

In the methodology, the authors conducted two studies. In Study 1, the RCS was compared to the CDT plus recall. Dementia was considered if participants had a score inferior or equal to five on the RCS and two on the CDT plus recall. They were then diagnosed with MCI if they score less than or equal to seven on the RCS and five on the CDT plus recall. This study had 702 male participants recruited in 2003 from the Veteran Affairs Medical Center (VAMC) hospitals. Twelve

percent of the participants had dementia, and 26% had MCI according to the DSM-IV criteria. The participants were followed up to 7.5 years to assess the correlation between RCS scores and nursing home placement and mortality. In that study, the RCS detected dementia with high sensitivity (89%) and specificity (94%) but had an 87% sensitivity and 70% specificity in detecting MCI. The second study had 168 participants from the Saint Louis University Geriatric Medicine and Psychiatry outpatient clinics. This study used the SLUMS to assess the sensitivity and specificity of the RCS. The RCS' sensitivity and specificity for dementia were 92% and 94 %, and was 69% and 82% for MCI, respectively (Malmstrom et al., 2015).

The analytical approach was consistent with the research design. The method section presented detail of the scale used, present figure, and statistical tools used to analyze the data. In study 1, the authors used regression logistic to compute mortality and nursing home placement and use the ROC curves to assess the tool's sensitivity and specificity. Moreover, Malmstrom et al. (2015) used the IBM SPSS statistics, version 22 and SAS, version 9.2. The result section was well detailed, with charts showing the data. The logistic regression had a confidence interval of 95%. The RCS and the CDT plus recall had a scale from 0-10 and 0-5, respectively, which were used on the ROC curves to compare both tools' sensitivity and specificity (Malmstrom et al., 2015).

This Randomized control trial study showed that RCS is a validated cognitive screening tool with good sensitivity and specificity to detect dementia and MCI. It is simple to use and can be administered in less than 3 minutes. The authors concluded that RCS might be a useful tool to screen for MCI and dementia in busy primary care clinics (Malmstrom et al., 2015).

Type and rate of errors in cognitive screening test administration

Malmstrom et al. (2015) studied the usefulness of the RCS in outpatient settings to detect MCI and dementia. However, Newman et al. (2018) study was to improve cognitive assessment.

As a result, Newman et al. (2018) conducted two studies to assess the extent and type of errors in test administration using a well-known cognitive screening instrument (CSI). According to the World Health Organization (WHO), diagnostic error is a high-priority problem in primary care across all countries. Singh et al. (2017) added that diagnostic errors are frequent in healthcare and harmful to patients. Newman et al. (2018) presented the result of two studies in this article. In one of the studies, the Addenbrooke's Cognitive Examination-III (ACE-III) was assessed for administrator error. The other study did a comparative assessment to evaluate the ACE-III and ACE mobile's measurement accuracy. The ACEmobile is an iPad-based version that the authors developed. The first study had 87 ACE-III result's sheets from the National Health Service (NHS) clinics out of 132. The patients were from four community mental health for older adults in Devon, UK. Psychiatric doctors and nurses, and occupational therapists completed the assessment with the ACE-III (Newman et al., 2018). Two raters anonymously rescored the ACE-III and resolved all discrepancies. In total, 78% of the scoresheets had errors. The most common errors were scoring (68%) and arithmetic (24%) (Newman et al., 2018). In Newman et al. (2018) second study, the researchers recruited 21 participants from training sessions on ACE-III administration. The 10 participants were randomly assigned to the ACE-III and 11 to the ACEmobile group. Errors were noted in all domains for the ACE-III group, but only in the language domain for the ACEmobile group. Both studies showed that cognitive test administration errors, especially in arithmetic and scoring, are common in clinical practice. Errors were most significant in clock drawing, sentences, and animal fluency subtests (Newman et al., 2018).

In this research paper, the researchers presented two studies to first assessed the nature of administration errors using the ACE-III cognitive screening tool. Then, to compare ACE-III to ACEmobile. This ACE-III is a validated instrument for cognitive screening and has an 88%

sensitivity and 82% validity. It is noted that administration errors are common in clinical practice. Even though specialist staff administers the test, still 22% of ACE-IIIs had error rates of five or more points. The study's main goal was to improve the quality of cognitive screening, and ACEmobile is one way to do so (Newman et al., 2018).

Reporting and scoring errors in cognitive screening tools

Since the implementation of the Affordable Care Act (ACA), cognitive screening became part of the AWV. However, screening is done in the primary care settings often has errors (Newman et al., 2018). While the objectives of Newman et al. in their study in 2018 were to find the rate and type of errors using a specific cognitive tool, the ACE-III, Cannon & Larner's (2016) study had a broader objective. They wanted to catch errors in any tools that are used in primary care. They completed a retrospective study to identify the nature of errors and the frequency of reporting and scoring errors in the most routinely used cognitive screening tools. From January to December 2015, the researchers collected data for all new patient referred by primary care providers to a Cognitive Function Clinic CFC) located at a regional neuroscience center in Liverpool, northwest England. Most of the referral letters include the cognitive screening total scores. The scores were classified using a simple ad hoc classification as unequivocal (no error noted), incorrect or ambiguous (items incorrectly scored, or patient and informant scores were not separately noted), and as incomplete (only verbal comment, like passed or failed). Once at the CFC, the specialists used standard clinical diagnostic criteria to diagnose patients with dementia (DSM-IV) and dementia subtype. They used structural neuroimaging and formal neuropsychological testing and conducted a clinical interview of patients' informant, if available, to diagnosed mild cognitive impairment (MCI). The sample size was 246, of which 93 were screened before being referred. The most common cognitive screening tools used were MMSE,

6CIT, and GPCOG. According to Cannon & Larner (2016), scoring errors were noted in (23%) of the reports, of which 13% had dementia.

The study is published in a peer-reviewed journal, Neurodegenerative Disease Management. The authors presented a summary of the study's key points, including the basis for the study because the detection of cognitive impairment in primary care is also a national directive in England. Even though there many validated instruments, correct scoring and reporting are necessary for correct diagnosis (Cannon & Larner, 2016).

The authors conducted a prospective longitudinal study over 12 months from January to December 2015 in Liverpool, England, to measure scoring and reporting error rates in the cognitive screening test performed in primary care settings. The diagnosis was compared with a diagnosis made by a specialist at a cognitive function clinic. According to the study, errors in scoring and reporting of (CSI) performed in primary care are frequent even if the tools are well known. Errors were most frequent with the Six-item Cognitive Impairment Test (26%) and the General Practitioner Assessment of Cognition (GPCOG) (32%). Among all cases in which a CSI was used, 23% had errors. The authors concluded that proper use of cognitive screening tools is essential to reduce the dementia diagnosis gap. Consequently, educational intervention to train staff on proper use and scoring of the tools is warranted. The study's findings suggest that further training in the use of cognitive screening tools in primary care is necessary to increase familiarity and confidence (Cannon & Larner, 2016).

Even though the methodology and the main objectives of Newman et al. (2018) and Cannon & Larner's (2016) studies were different, the studies had the same conclusion. Both studies concluded that errors are common in utilizing cognitive screening in a clinical setting, and training is essential to improve screening. The authors addressed an important issue about cognitive

screening in clinical practice. The aims of the study were clear and precise. In the background section, the authors presented a previous study that showed the GPCOG was incorrectly used in over 30 % of cases to support the aims of the study. This prospective longitudinal study, which was an observational study, has a level II of evidence. This study design was appropriate to meet the goal of the study. (Caruana et al., 2015). The researchers used the standard statistical methods to examine the null hypotheses, which stated that proportions in the cohorts were the same (Cannon & Larner, 2016). This study's result section was cumbersome because the researchers did not use any graph or table to show their findings. However, the discussion was clear. Finally, the authors summarized the study, explained the findings and their implications. Since this was an observational study, no IRB approval was necessary. (Cannon & Larner, 2016).

Outcome of training program for nurses in primary care

The previous four studies evaluated tools for the most practical, sensitive, and specific to screen for MCI and dementia. They also assessed the types and rate of errors in cognitive tool administration; however, Islam et al. (2020) conducted a quantitative research study to evaluate the outcome of a training program for nurses in primary care. The authors of the study developed a training program on the 'Four Steps to Building Dementia Practice in Primary Care' to educate nurses on timely diagnosis and dementia management. Before the training, a needs analysis was done in 2015 among nurses in primary healthcare to guide the study. In this study, the primary healthcare nurses first had face-to-face and or online training on timely assessment and dementia management (Islam et al., 2020). A longitudinal survey was then done using three 10-point Likert scale questionnaire to assess the current practice's processes and services. The three questions were self-perceived levels of importance, level of knowledge of the nurse's role, and confidence to assess and manage dementia. The survey was done before the training, immediately after training,

and another survey 3 to 9 months later to evaluate the training. The clarity and appropriateness of the question items in the questionnaire were pretested by a smaller group of primary health care nurses (Islam et al., 2020).

This evaluation study by Islam et al. (2020) has an abstract that provides the background, the objectives, and the design of the study. The study had 1290 primary healthcare nurses from all the states and territories in Australia. The study used validated tools for training and evaluation. The questions on the Likert scale were appropriate to meet the study objectives. The sections of the study were well presented with detail on the content. The details to develop the training module was clear. The four steps in the educational training program were presented in tables. The descriptive design was also appropriate for this study. The result section compares the demographic characteristics of the participants with the national population of primary healthcare nurses. This section also has tables to present the result of the pre- and post-training surveys. The result section also has a comparative chart to present the difference between the pre-training face-to-face and online and the difference between post-training face-to-face and online (Islam et al., 2020). The discussion summarized the study, re-state the result, present the strengths and weaknesses of the study. The conclusion presents the need for the study and the need to disseminate the training program evaluated that was evaluated. The researchers proposed further research to assess how the improvement from the training program can translate into practice. The study has good strengths due to its large sample, including participants from all Australia and its territories. Moreover, the questionnaires to evaluate the training were reviewed by a multi-disciplinary team (Islam et al., 2020). The researchers did not have any conflict of interest.

The study by Islam et al. (2020) developed a training program for primary health care nurses. Furthermore, the study also evaluates the program, which was very useful for improving

nurses' knowledge, confidence, and perceived importance to diagnose and manage dementia. There were higher scores in all the measured items in the post-training. The training program is effective with either face-to-face and or online sessions. However, the participants had more significant improvements in face-to-face training than online training. The study can improve nurses' knowledge to promote timely diagnosis and management of dementia in primary care settings (Islam et al., 2020).

Barriers preventing PCPs from diagnosing and managing patients with dementia.

Since the mandate to screening cognition during AWV, the role of primary care providers (PCP) in assessing and caring for people with cognitive impairment is becoming more critical. It is known that PCPs face many challenges to provide quality care to patients with cognitive impairment. Mansfield et al. (2019) conducted a review to assess the barriers at all levels that prevent PCPs from diagnosing and managing patients with dementia. The study is a systematic review that included quantitative studies published in English from January 2006 to July 2016 on barriers to quality dementia care according to PCP's perceptions. Once all articles were selected according to the inclusion criteria, an author screened all the titles and abstracts. Then, a second author reviewed the selected articles and resolved all coding discrepancies. The authors assessed the studies' methodological quality using the EPHPP quality assessment tool for quantitative studies and sample size. They only selected studies rated as strong and moderate according to the quality tool criteria. The authors extracted perceived barriers about diagnosis or management from the selected articles and classified them as patients, providers, and systems related. Twenty of the 537 studies were screened according to the PRISMA flow diagram and selected for the review. After extracting data from the studies, the authors found that most providers reported a lack of training, lack of confidence, or comfort as primary barriers to diagnose and manage dementia.

Lack of training to diagnose and manage dementia was a barrier noted across all studies and may be overcome with educational interventions. The barriers were consistent through time and counties. The authors concluded that since all the articles included in this review used robust methodologies, any interventions implemented according to the findings should improve clinical practice (Mansfield et al., 2019).

This study is a well-researched systematic review with peer-reviewed articles that includes articles from 2006 to 2016 from many countries, such as United States, Canada, United Kingdom, and Ireland. This article determined challenges to quality dementia care according to PCP's perceptions. The authors found that lack of training or knowledge and lack of confidence or comfort as the most common provider-related barriers to diagnose and manage dementia in outpatient settings. However, most PCPs perceived a lack of training as a general barrier. The authors concluded that educational intervention should improve PCP's knowledge and dementia care in primary care (Mansfield et al., 2019).

Barriers to lack of cognitive screening in primary care

Like Mansfield et al. (2019), Romano et al. (2020) wanted to identify barriers to a lack of cognitive screening in primary care. While Mansfield et al. (2019) evaluate the challenges according to PCP's perceptions, Ramano et al. (2020) studied organizational and environmental factors. In their study, Romano et al. (2020) noted that more than 50 % of patients with Alzheimer's disease had a delayed diagnosis, and most patients were not diagnosed in the primary care setting. This delay in diagnosis may lead to a delay in management, which may negatively impact the patients' quality of life. As a result, the authors conducted an integrative review to find factors in the healthcare system that contribute to the lack of routine dementia screening by primary care providers (Romano et al., 2020).

An integrative review is a critical summary of past research from the literature on a specific topic to draw general conclusions. It critically appraises and combines available evidence and theory. The search is integrative review is defined and based on keywords from papers in 2-6 databases to provide recommendations. Only one reviewer may do its appraisal. In contrast, a systematic review is a method to obtain evidence to translate into practice, especially when making healthcare decisions. It is precise and exhaustive with a rigorous appraisal done by at least two independent reviewers using valid and reliable tools based on the study research (Holly, 2014).

The authors used keywords related to the study's objectives to find articles through PsycINFO, Cochrane Central Register of Controlled Trials, MEDLINE, and CINAHL databases. The authors found 140 articles about dementia that are empirical studies in the English language from peer-reviewed journals. However, after reviewing and analyzing the articles against the inclusion and exclusion criteria, only seven were selected for the review. The review includes peer-reviewed, empirical studies in the English language that present barriers in the primary care setting that affects dementia screening. The barriers may be related to providers, patients, or organizations. Other essential criteria were primary case setting and articles that identified factors contributing to missed or delayed diagnosis. All studies included were reviewed using a bias risk tool and scoring criteria to assess the studies' quality; most had high quality. All authors approved the final studies included in the review. Data were collected using a piloted data collection form to obtain important information that addresses the review's goals (Romano et al., 2020).

The integrative review study by Romano et al. (2020) conducted a well-search review and identified many factors that affect the diagnosis of dementia in primary care settings. The most common are provider educational needs and patients' risks and comorbidities. Even though organizational and environmental factors also contribute to delayed and missed diagnoses and

dementia care, they were not studied as primary variables. According to Romano et al. (2020), implementing a screening process for early dementia diagnosis is not enough. Hence, organizations must implement critical steps that focus on clarifying testing procedures and improving the support system.

Summary of the literature

This literature review included seven articles on factors that cause delayed, underdiagnosis, and missed diagnosis of cognitive impairment in primary care. According to Razak et al. (2019), finding an appropriate and valid tool is essential to improve practice. Their systematic review found updated evidence on screening tools' validity to assess dementia and mild cognitive impairment among the older adults' population in primary care settings. According to their result, the MoCA, ACE-III, SSLUMS, RCS, and BCAT have adequate sensitivity and specificity for primary care use. However, for Malmstrom et al. (2015), since they are many valid tools and since lack of time is one of the most frequently reported barriers to screen, they wanted to find a brief tool that is easy to use busy primary care setting. After conducting a study to compare the RCS to the clock drawing, they noted that the RCS a valid, brief, and simple cognitive screening tool to use in primary care settings Malmstrom et al. (2015).

Like Mansfield et al. (2019), Romano et al. (2020) wanted to identify barriers to a lack of cognitive screening in primary care providers. While Mansfield et al. (2019) evaluate the challenges according to PCP's perceptions, Ramano et al. (2020) studied organizational and environmental factors. In their study, Romano et al. (2020) noted that more than 50 % of patients with Alzheimer's disease had a delayed diagnosis, and most patients were not diagnosed in the primary care setting. This delay in diagnosis may lead to a delay in management, which may negatively impact the patients' quality of life (Romano et al., 2020).

According to Mansfield et al. (2019), most providers reported a lack of training on screening tools as a primary barrier to diagnose and manage cognitive impairment. This barrier to cognitive screening was noted across all studies and was also evident in the 2016 study of Cannon & Larner. These researchers found that scoring and reporting errors were frequent and significant in primary care's cognitive screening instruments. Errors in diagnosis are a concerning problem, mostly when the error rate was highest in two of the most frequently used cognitive assessment tools, the 6CIT and the GPCOG (Cannon & Larner, 2016). While Newman et al. (2018), in their study on the administration and scoring of the ACE-II, found an error rate of 78%. They concluded that errors in administration, scoring, and reporting were frequent in routine cognitive screening tool use even if specialist staff administer the test.

Newman et al. (2018) conducted a research to assess the extent and type of errors in test administration using a well-known cognitive screening instrument. They found that cognitive test administration errors, especially in arithmetic and scoring, are common in clinical practice. This makes ongoing training on cognitive screening tool in primary care setting essential to improve practice. According to Islam et al. (2020), training is significant to improve knowledge, confidence, and awareness of medical staff in primary care and should be ongoing to ensure long-term sustainability. In their study, Islam et al. (2020) developed and evaluated a training program for primary health care nurses on prompt diagnosis and dementia management.

Purpose/ PICO Clinical Questions/Objectives

Purpose

Cognitive function screening is required for new patients and during annual visit for patients suspected of mentation changes. However, there are no ongoing training or refreshers for senior staff and no training during the new staff orientation process. Furthermore, there is no formal protocol or screening process, such as when and whom to screen. As a result, the cognitive

screening has not been completed. According to Mansfield et al. (2019), PCP's lack of training is a general barrier causing this diagnosis gap in primary care settings. The main goal of this DNP project is to improve cognitive screening in the clinical setting. This project aims to implement an educational program to train medical assistants on cognitive impairment and on the proper use of the cognitive assessment tool called the Saint Louis University Mental Status (SLUMS). This intervention should increase the medical assistants' knowledge and confidence in using the SLUMS. It should also increase the screening rate and accuracy. As a result, it will improve the quality of care of patients.

Clinical question

Will an educational intervention help improve knowledge of cognitive screening in primary care?

PICO Acronym

Population (P)—medical assistants, also called medical technicians, intervention (I)—educational intervention, comparison (C)— no formal process, outcome (O)— improve knowledge of cognitive screening in primary care.

Objective goals and outcomes.

This project will train medical assistants on how to administer the SLUMS. It will also provide information about the importance of cognitive screening. Hence, this project will increase the medical assistants' knowledge and confidence in using the SLUMS. As a result, clinical practice will note an increase in cognitive screening, diagnosis, and neurology referral rates.

Goal 1: The medical assistants' knowledge and confidence in the signs and symptoms of cognitive impairment and Alzheimer's dementia will improve by at least 50% at the end of the training session.

Specific

Improvement in knowledge, skills, and confidence is a specific goal that the educational intervention will be designed to meet. According to (Mansfield et al., 2019), educational intervention is essential to improve PCP's knowledge and dementia care in primary care.

Measurable

The DNP student will measure the improvement in knowledge, skills, and confidence as outcome variables using a pretest-posttest questionnaire. The answers will be computed and compared on both tests.

Attainable

The educational intervention will include information on signs and symptoms of cognitive impairment and Alzheimer's Disease. A well-designed educational intervention should show a noticeable improvement in knowledge by at least 50%.

Relevant

Improvement in knowledge is a relevant goal to close the gaps in screening for cognitive in primary care settings. According to Islam et al. (2020), educational interventions can improve nurses' knowledge to promote timely diagnosis and management of dementia in primary care settings.

Time-bound

The time to meet this educational intervention's goals will be right after the training session is completed.

Goal 2: At the end of the training session, the medical assistants' knowledge and skills to administer the SLUMS correctly will improve by at least 50%.

Specific

Correctly administer the SLUMS is a specific goal that the educational intervention will be designed to meet. They will be a video from the SLUMS webpage, which will show how to administer the SLUMS. Also, the video shows a provider administering the SLUMS on a patient in a clinical setting.

Measurable

To measure the improvement in knowledge and skills on the SLUMS administration, the medical assistants will complete the SLUMS while watching the video and according to the patient's answers in the video. Then, they will complete the SLUMS again after watching the video. The two sets of scores from scoring the SLUMS are quantitative data, which will be compared to assess improvement.

Attainable

The educational intervention will include instruction on how to administer the SLUMS correctly. The educational intervention will be designed to show an improvement in knowledge by at least 50%. Cannon & Larne (2016) suggested in their study that further training in the use of cognitive screening tools in primary care is necessary to increase familiarity and confidence.

Relevant

Correctly administering a cognitive screening test is a relevant goal in healthcare, considering the prevalence of errors. Cannon & Larner's (2016) concluded in their study that errors are common in administering cognitive screening in a clinical setting. According to the Alzheimer's Association (2017), quality care for people with Alzheimer's disease and other dementias begins with an early, documented, and disclosed diagnosis. Training is essential to improve cognitive screening (Cannon &Larner, 2016).

Time-bound

Improvement in knowledge and skills will be measured the same day after the training session.

Definition of Terms

The following terms not commonly known to a reviewer or colleagues are:

- Cognitive screening - A screening to assess cognitive problems in individuals who are at high risk for progressive dementia or delirium (Segal-Gidan, 2013).

- Centers for Disease Control (CDC) - The body that tracks and oversees health related issues for the United States government (CDC, 2011).

- Dementia - A syndrome defined as memory loss with impairment of daily living (Wong, 2020). Alzheimer's Disease is the most common cause of dementia. It is a progressive and multifocal disease associated with loss of memory and cognitive function and functional impairment (Alzheimer's Society, 2019)

- Evidence-based practice (EBP) - Applying the best available research results in practice (Stillwell, Fineout-Overholt, Melnyk, & Williamson, 2010).

- Likert scale - A validated and reliable rating scale used in survey research to assess opinions, attitudes, or behaviors. It is a scale used to measure different variations, such as statements of agreement, frequency, importance, likelihood, and quality (McLeod, 2019)

- Mild cognitive impairment- A slight decline in cognitive abilities such as memory and thinking that is noticeable to the person affected and to their family members and friends, but do not interfere with the individual's activities of daily living (Alzheimer's Association, 2020).

- Primary care providers - Medical doctors and nurse practitioners who work in outpatient family or general practice.

- Promoting Action on Research Implementation in Health Services (PARIHS) – Is a framework consisting of three key elements to implement evidence-based research into practice: The evidence (E), Context (C), and facilitator (F) (Rycroft-Malone, 2004).

- Saint Louis University Mental Status examination (SLUMS) - A tool used to identify a change in cognition, such as mild cognitive impairment and dementia. The SLUMS is a seven-minute cognitive screening tool with eleven questions for 30 points covering attention, memory (immediate and delayed), orientation, and executive function (Saint Louis University, 2020).

Conceptual Underpinning and Theoretical Framework of the Project

Theoretical frameworks are the foundation that guides research studies. It helps select the variables and show their relationship (Melnyk et al., 2019). One of the frameworks to guide this DNP project is the Promoting Action on Research Implementation in Health Services (PARIHS). This framework has three interacting steps or key elements to implement evidence-based research into practice. The elements are evidence (E), Context (C), which is the local setting where the practice change will be implemented, and Facilitation (F). According to this framework, each element is as essential as the other for a successful implementation process. The implementation of the best evidence is dependent on the appropriate setting or Context and the way the evidence is introduced or facilitate into the practice (Rycroft-Malone, 2004).

In the evidence step, the DNP student reviewed the literature to assess current knowledge and identify the latest evidence. The DNP student found seven related articles that present the evidence for the project. According to (Newman et al. (2018) errors in administering cognitive screening tests are common in clinical practice. Moreover, Cannon & Larner (2016) found that scoring and reporting errors in cognitive screening performed in primary care were frequent even if the tools are well known. They concluded that educational intervention to train staff on the proper use of cognitive assessment tools is essential to reduce the dementia diagnosis gap.

According to the PARIHs framework, even though the evidence is robust, successful implementation requires a Context that is permissive to the application of evidence-based research. The Context or organization must have a culture that promotes learning and requires a strong leadership receptive to change. The organization where this DNP project was implemented meets these requirements. The leadership team value learning, teamwork, and staff input to improve the patient's quality of care.

Facilitation is the last element of the PARIHs framework. It is the process that facilitates the change in practice (Melnyk et al., 2019). This element requires a skilled facilitator for successful implementation. The DNP student will be the facilitator.

The PARIHS framework not only guides the research project but can also be used as an evaluative tool or checklist during or after the implementation project to assess progress. Before the dissemination of this DNP project, it was evaluated and adjusted accordingly. Following these steps of the PARIHS assure successful translation of evidence into practice and a more significant outcome (Melnyk et al., 2019).

Figure 1: Three interacting key elements to implement evidence-based research into practice.

Context
. Culture for learning
. Leadership receptive to change.
. Approval of DNP project

Evidence
. Brief tool
. Lack of time
. Lack of training
. Lack of confidence
. Errors

Facilitator
Process to facilitate change in practice
. DNP student will be the facilitator
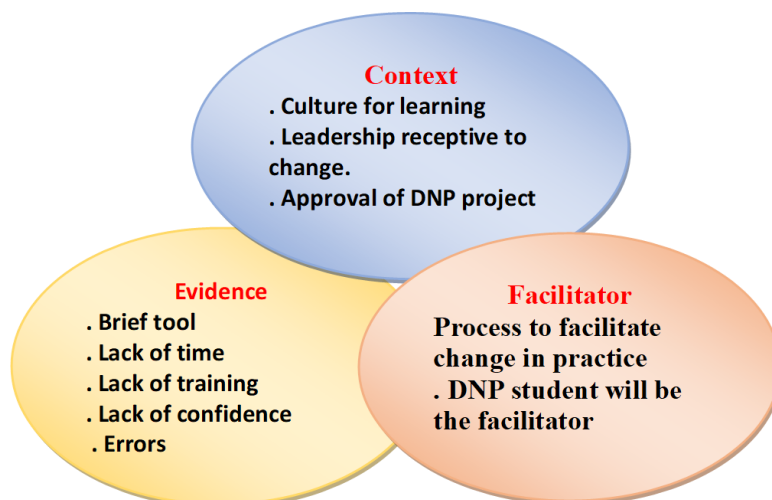
Another theory applicable to this DNP project is the grand theory of patient-centered nursing, also called the "Twenty-One Nursing Problems Theory," published in 1960 by Fay Abdellah. According to Abdellah's theory, the concepts of health, nursing problems, and problem-solving interrelated. Abdellah mentioned that nurses address 21 problems, representing three categories, physical, social, and emotional. Cognitive impairment has problems that fit each of these categories, making this theory ideal to address the challenges related to cognitive screening. Furthermore, this theory applies to the nursing process. The patient-centered nursing theory focuses on assessing the patient's condition and designing an appropriate plan of care and interventions. Since some of the patient's problems may be covert, nurses must identify the problem, make a nursing diagnosis to set goals, and provide individualized patient care (Gonzalo, 2019).

Methodology

Setting

This DNP scholarly project was implemented at a primary healthcare center in Miami-Dade County, FL. This healthcare center has 13 clinics in the area that open from 8:00 AM to 5:00 PM and offer pediatric, woman's health, and geriatric services. The company's medical director gave his approval for the project and believe that the project will increase staffs' knowledge and awareness for routine cognitive impairment screening. The company has a Chief Executive Officer (CEO), a Chief Medical Office, a general Medical Director, a several local Medical Directors. The clinical site has one medical doctor (MD), three medical assistants (MA) and two advanced registered nurse practitioners (ARNP. The clinical site serves an average of 80 Medicare patients 65 years and older a week, making it an ideal site for cognitive screening. The SLUMS is the current cognitive screening tool used throughout the company's clinics.

SWOT analysis of immersion site

Strength

The NW 27th medical center has many strengths that make it an appropriate setting for this DNP project. First, it has a large Medicare population. The Center for Medicare and Medicaid Services (CMS) requires a cognitive screening to be completed for patients 65 years and older during the AWV. Second, the organization already uses a validated tool, the SLUMS. There is no recommendation on which tool is best to use in primary care for cognitive screening (Alzheimer's Association, 2019). Third, cognitive screening is already required for new patients and patients with suspicion of mentation changes. Medical assistants must understand the instruction of the tool to do the screening correctly. Fourth, the organization works with a neurologist who, upon referral, can further assess and diagnosed the patients. Having a neurologist in the organization who can conduct further diagnostic testing for positive cognitive screening patients facilitates early diagnosis and management. Finally, the providers, the medical director, and the chief medical officer are on board with the project. According to Melnyk et al. (2019), alignment of stakeholders and administrative supports is an essential facilitator for evidence-based practice (EBP) projects.

Weakness

Even though this site has multiple strengths, it is worth noting that it has some weaknesses. First, there is no ongoing training or refreshers for senior staff and no training during the new staff orientation process. Consequently, this quality improvement project would be significantly beneficial to improve screening in this clinical setting. Second, there is no standard protocol for cognitive screening. Cognitive screening for establishing patients at the clinical site is based on suspicion of mentation changes. Last, the SLUMS takes an average of 7 minutes to complete.

According to Mansfield et al. (2019), lack of time was the most common provider-reported barrier to screen for cognition. Cognitive screening tools for primary care should be brief, meaning take 5 minutes or less and easily administered by non-physician medical staff members (Alzheimer's Association, 2019)

Opportunity

According to the weaknesses mentioned above, there are some opportunities to improve practice at the clinical immersion site. There is an opportunity to have a structured educational program, as proposed in this DNP project for ongoing medical staff training. Although this is not the scope of this project, the medical director can implement a shorter cognitive screening tool at the clinical immersion site.

Threats

Perceived threats are the staff's willingness to apply the knowledge gained from the training to increase compliance and consistency during the implementation. Moreover, the staff lacks accountability to adhere to the protocol for screening, which this DNP project educational intervention may alleviate by teaching staff the importance of screening patients.

Participants

The participants were medical assistants at the medical center. They were trained on cognitive impairment, cognitive screening using to SLUMS to improve cognitive screening in the clinical setting. The educational intervention included information about the definition of cognition, cognitive impairment, dementia, and Alzheimer's Disease. It presented the epidemiology, importance of cognitive screening, signs, and symptoms, and the risk factors of cognitive impairment and Alzheimer's Disease. Finally, the educational intervention provided detailed instructions on the steps for the appropriate administration and scoring of the SLUMS.

According to Islam et al. (2020), training is significant to improve knowledge, confidence, and awareness of medical staff in primary care and should be ongoing to ensure long-term sustainability. Cannon & Larner (2016) added that training is necessary to increase the medical staff's familiarity and confidence in using cognitive screening tools in primary care settings.

Description of approach and project procedures

The DNP student obtained a letter of support (see Appendix A) from the healthcare organization's medical director, which summarized the quality improvement doctoral project. The medical director was pleased with the proposed educational intervention and provided his approval. This project also received the IRB approval (see Appendix B) and is now ready to move to the implementation stage.

After receiving the email list of all the company's medical assistants form the medical director's secretary, an email was sent to all medical assistants at the company on March 12th. This email provided information on the date and time of the study and had an attached recruitment letter (see Appendix C) which present a detailed description of the study process. On March 23rd, the invitation link to the Microsoft teams was sent to all MAs. On the day of the educational intervention, the participants received two Qualtrics links. One link included the consent (see Appendix D), demographics, and pretest questionnaire. The other included the posttest questionnaire. The consent presented the study's objectives in grade-school level language. It described the study process and explained that participation in the study was voluntary, anonymous, and without compensation.

The project started in one center and will be disseminated to all the other centers. Information about the project was posted at the centers and medical assistants were informed of the project via work email. The whole project was done virtually and online using Microsoft teams and Qualtrics. There was no face-to-face contact.

The project author provided all the materials and conducted the training session. The educational program was an online presentation that included a PowerPoint presentation and a short official video on the administration of the SLUMS from the Saint Louis University webpage to educate MAs on how to use the SLUMS properly and the process to screen for cognition. Time was provided to address the MA's concerns and for extra practice if needed. A pretest-posttest questionnaire was developed to evaluate the training intervention. Furthermore, the MAs practiced scoring and completing the SLUMS while watching the same demonstration video before and after the training to assess for improvement in scoring. Upon completion of the training, MAs were able to identify when to do cognitive screening and correctly use the SLUMS.

The cognitive screening educational intervention project included the following steps:

1. The participants completed the demographic, including general information such as age, gender, and a pretest questionnaire using the first Qualtrics link. Then, they completed the SLUMS while watching a six-minute video of a healthcare provider administering the test before the training.

2. They watched the educational presentation on cognitive impairment and the SLUMS administration.

3. They completed the SLUMS again while watching the same six-minute video of a healthcare provider administering the test.

4. Finally, they completed the posttest questionnaire.

After completing the intervention, all data were retrieved from the Qualtrics system and analyzed. The SLUMS completed before the intervention was compared to the one completed

after the intervention. The pretest and the posttest were also compared to assess the intervention's success and see if the study's objectives were met.

Stakeholders' support is essential to a successful QI implementation (Moran, Burson & Conrad, 2014). Hence, the DNP student kept the stakeholders informed and engaged throughout the project to ensure a successful implementation. Even though minimal technological skills were required for this project, on the day of the project, the DNP student was available to guide all participants on accessing the Qualtrics page if any difficulties arose and answered any questions.

Protection of Human Subjects

The DNP student obtained Institutional Review Board (IRB) approval from Florida International University (FIU) before starting the project. The DNP student has written approval from the medical director of the healthcare center. The participant will be a convenience sample of medical assistants at the medical center. They participation will be voluntary, and consent will be obtained.

Data Collection

According to Mansfield et al (2019), lack of training, and lack of confidence are the primary barriers to diagnose and manage dementia in primary care settings. Moreover, in a study by Islam et al. (2020), it was noted that training can improve nurses' knowledge to promote timely diagnosis and management of dementia in primary care settings. The educational program developed by the DNP student improved medical assistants' knowledge of cognitive impairment and improve their confidence in using the SLUMS to screen cognitive function of patients to increase cognitive screening at the at the clinical site. Consequently, the DNP student collected data to measure these three variables, knowledge, confidence and skills which helped evaluating the effectiveness of the educational program and its implementation.

The DNP student developed a pretest and posttest questionnaire to collect data about MAs' knowledge on cognition and using the SLUMS. This questionnaire called the "Cognitive screening pretest-posttest questionnaire" (see Appendix E). The questionnaire has twenty-seven questions of various styles such as true or false, select all that apply and 5-point Likert scale to evaluate the MAs' improvement in knowledge and confidence using the SLUMS to perform cognitive screening after the training session in this DNP quality project. The questions will also provide data to assess the success of the educational program.

Likert scale is a validated and reliable rating scale used in survey research to assess opinions, attitudes, or behaviors. It is a scale used to measure different variations, such as statements of agreement, frequency, importance, likelihood, and quality (McLeod, 2019). Since the Likert scale is an ordinal rating tool, it allows quantitative analysis of data. The pretest and posttest questionnaire will be anonymous and will be completed online via Qualtrics. Anonymity in survey methods reduces social desirability bias and increases validity (McLeod, 2019). Additionally, anonymous surveys are more likely to promote higher disclosure rates of sensitive information than non-anonymous methods. Furthermore, researchers considered higher disclosure rates to be more accurate than lower rates (Murdoch et al., 2014).

The Saint Louis University Mental Status Exam (SLUMS) (Appendix F) is a tool used to assess mild cognitive impairment and dementia. It is required that medical professionals watch the Veterans Affairs' training video on the SLUMS administration before the implementation of the tool in practice and annually after that (Saint Louis University, 2020). The SLUMS is a seven-minute cognitive screening tool with eleven questions for 30 points covering attention, memory (immediate and delayed), orientation, and executive function. According to a validity study by Tariq et al. (2006), in people with less than high school education, the SLUMS had a sensitivity

of 92% and 100% and a specificity of 81 % and 98% for MCI and dementia, respectively. However, in patients with at least a high school education, the sensitivity was 95% and 98%, and the specificity 76% and 100% for MCI and dementia, respectively.

Data management and analysis plan

The DNP student starts this process to create an educational program to improve cognitive screening in the clinical setting. The DNP student will be the only person managing the data. All data will be kept on a password-protected computer. Data will be collected according to the project goals and objectives. The data will be analyzed to answer this DNP project PICO question: will an educational intervention improve knowledge about cognitive screening and the use of the SLUMS in primary care settings?

The educational intervention will have information about the definition of cognition, cognitive impairment, dementia, and Alzheimer's Disease. It will present the epidemiology, the signs and symptoms, and the risk factors of cognitive impairment and Alzheimer's Disease. Finally, the educational intervention will provide detailed instructions on the steps for the appropriate administration and scoring of the SLUMS.

The DNP student created the "Cognitive screening pretest-posttest questionnaire" to evaluate if the educational intervention improves medical assistants' knowledge and confidence in using the SLUMS to screen cognition in the clinical setting. The questionnaire will provide quantitative data to assess for improvement after the educational program. The study design will be a one-group pretest-posttest. The same group of participants will complete the "Cognitive screening pretest-posttest questionnaire" before and after the training session. The data collected from each question of the pretest questionnaire will be compared to the posttest and analyzed to assess for improvement in knowledge and confidence.

<center>**Results**</center>

This quality improvement project had eleven consented participants. Participation was voluntary, and all participants completed the entire project, which included a pretest and posttest questionnaire and an educational session. Hence, the pre-and post-intervention samples were the same. The participants were all female, 3 African Americans (27%), and 8 Hispanics (73%).

Table 1: Participant demographics

Ethnicity	Number (*n=11*)	Percentage
Hispanics	8	73%
African Americans	3	27%
Gender	Number (*n=11*)	Percentage
Female	11	100%

Pre-and posttest analysis of the SLUMS exam scoring accuracy.

Before the educational intervention, all participants completed a SLUMS exam while watching a video from the Saint Louis University website. In the video, the provider completed the SLUMS by asking the patient the questions. The participants had a copy of the SLUMS and had to score the exam as the patient answers the questions. Only one participant (9%) correctly scored the exam. The other 10 participants (91%) scored the exam incorrectly. Among the incorrect scores, four had at least three points above the correct score, and six had 1 to 2 points lower than the accurate score. After completing the educational intervention, all participants had to complete the SLUMS exam again while watching the same video they watched before the intervention. Nine participants (82%) scored the exam accurately, and two participants (18%) scored incorrectly. A 73% improvement in scoring accuracy was noted among the participants.

Figure 1: SLUMS scoring accuracy.
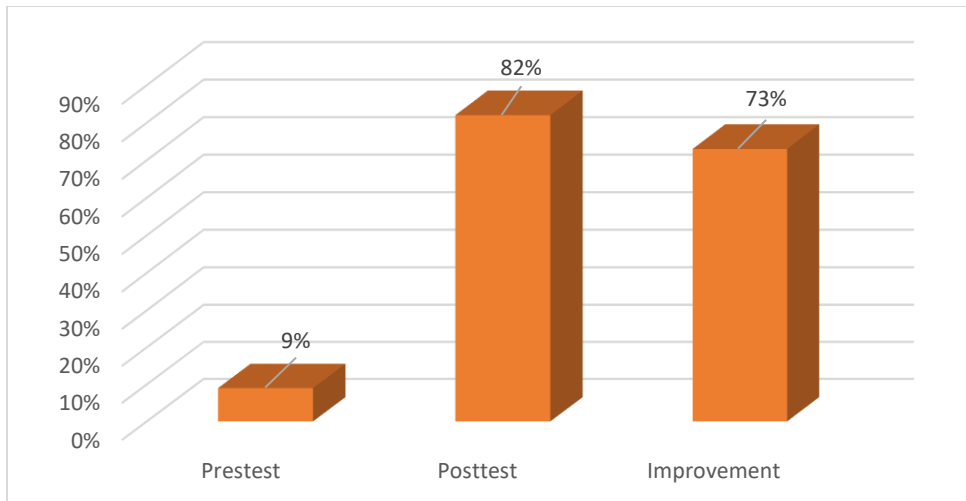
Pre-and posttest analysis of knowledge of cognitive impairment and cognitive screening tool, SLUMS

The participants were asked to assess their knowledge of cognitive impairment and the SLUMS before and after the intervention. Before the intervention, 58% of the participants believed their knowledge was good to excellent, increasing to 79% after the intervention.

Figure 2: Knowledge of cognitive impairment and the SLUMS.
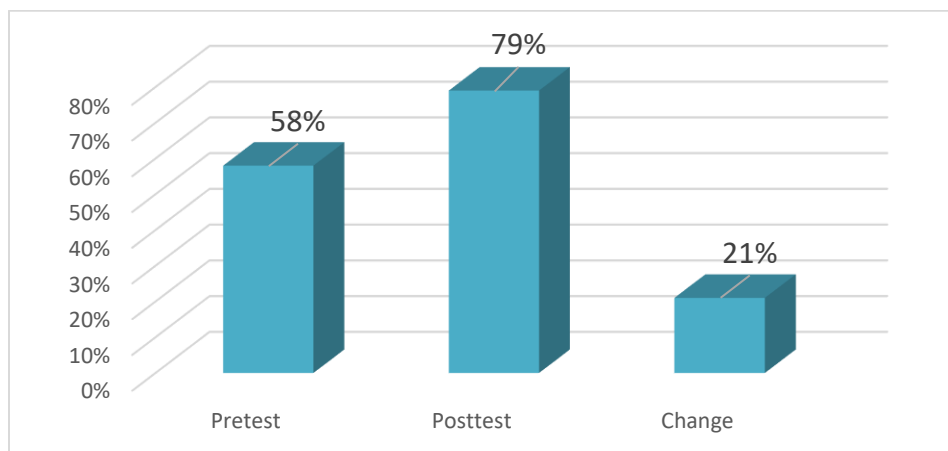
Pretest and Posttest analysis of medical assistants' education on cognitive impairment/dementia/Alzheimer's disease and the SLUMS

Overall, the participants scored 46% on the test before the invention, with 45% of the participants achieving at least 50%. Thus, this section of the questionnaire was the most important as it evaluates the overall benefits of the educational intervention. Moreover, before the intervention, only 36% of the participants knew the purpose and importance of the SLUMS and understand that people with cognitive impairment are more likely to be hospitalized than people with other chronic diseases.

Upon completion of the intervention, the average score of the participants on the test was 77%, representing an increase of 31%, see figure 3. All the participants (100%) scored at least 50% on the survey. Hence, a 55% improvement in knowledge was noted, see figure 4. Furthermore, after the intervention, 91% of the participants knew the purpose of the SLUMS (to screen for mild cognitive impairment and dementia), compares to 36% before the intervention. The participants had a 46% increase in understanding of hospital admission among people with cognitive impairment after the intervention.

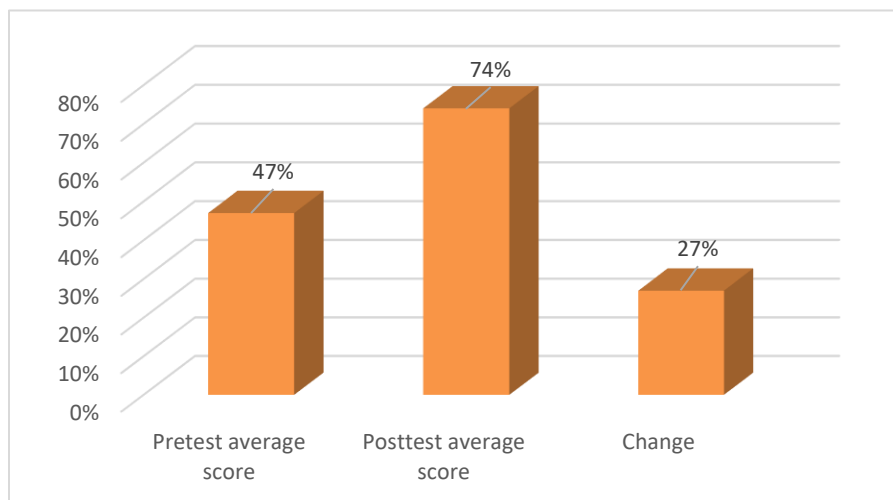**Figure 3: Assessment of knowledge of cognitive on impairment and SLUMS**

Figure 4: Score of at least 50% before and after the intervention
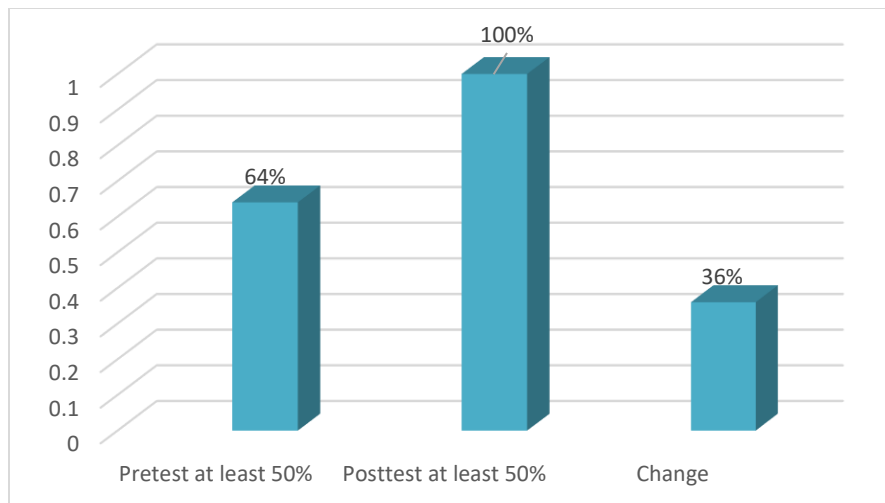
Pretest and posttest analysis on skills to administer the SLUMS exam.

They are many steps to perform the SLUMS examination correctly. For example, medical staff must know to record the level of education on the exam form because the interpretation of the score varies according to patients' education level. For example, a score of 25 and 26 is classified as a mild neurocognitive disorder for patients with high school education. In contrast, these identical scores are normal for patients with less than high school education. Also, a score of 20 is classified as dementia for patients with high school education or higher degrees, and the same score is a mild neurocognitive disorder in people with less than a high education level. Before the intervention, an average of 64% of the participants showed knowledge of the basic steps to administer the SLUMS exam. After the intervention, 82 % of the participants had a complete understanding of the steps. The intervention contributed to an 18% improvement in knowledge of the steps to administer the SLUMS.

Figure 5: Steps to administer SLUMS exam accurately.
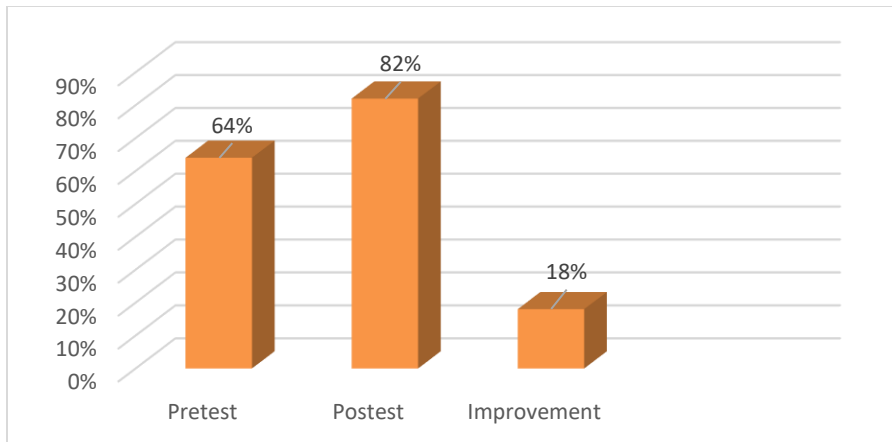
Pretest and posttest analysis of confidence and skills to accurately administer the SLUMS

The questionnaire had a Likert scale section where participants were asked to rank their level of agreement with several statements related to cognitive screening in older patients. Before the intervention, an average of 57% of the participants agreed to have the necessary skills and confidence to administer the SLUMS accurately. Which was increased to 93% after in the intervention. After the educational intervention, all the participants agreed that assessing the memory of patients 60 years and older at least once a year is essential. Furthermore, a 36% improvement was noted in the confidence and skills of the participants to administer the SLUMS accurately. All categories of the intervention showed improvement after the intervention.

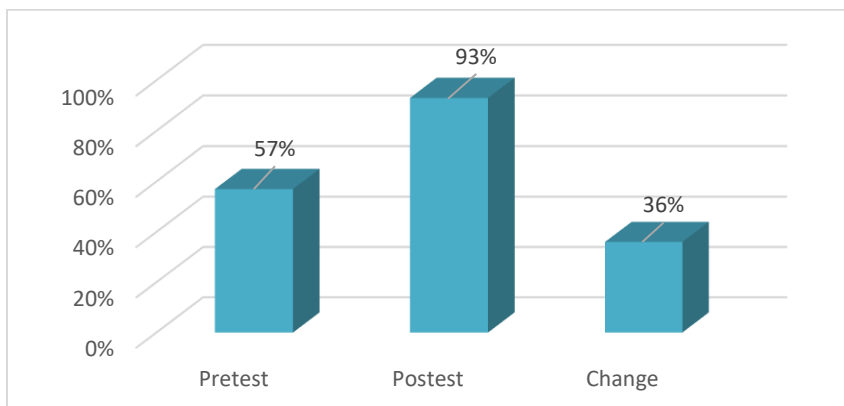**Figure: Confidence and skills to administer the SLUMS**

Figure 7: Summary of results

Summary

	SLUMS Scoring accuracy	Skills to administer SLUMS	Confidence and skills	Knowledge of CI and SLUMS	Group Average
■ Pretest	9%	64%	57%	58%	46%
■ Postest	82%	82%	93%	79%	77%
■ Improvement	73%	18%	36%	21%	31%

(Bar chart with y-axis labeled 100%, 50%, 0%)
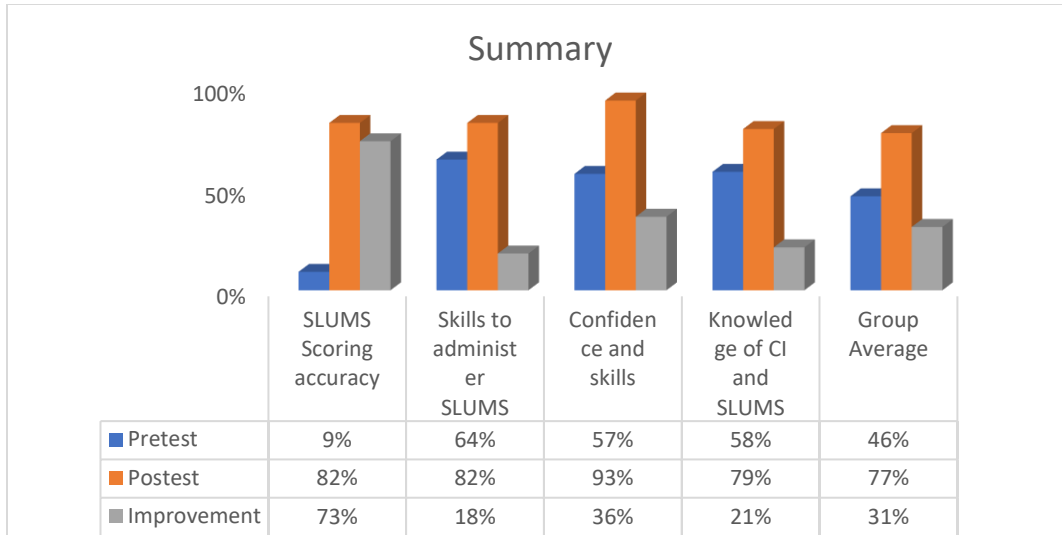
Discussion

This quality improvement project was aimed at improving cognitive screening in primary care. As a result, the investigator created an educational intervention according to the literature findings to meet this project's objectives and goals. Scores in all sections of the questionnaire improved after the educational intervention. Before the educational intervention, most participants agreed that it is essential to assess the memory of patients 60 years and older at least once a year. However, there was a lack of confidence, knowledge, and skills to use the SLUMS accurately. After the intervention, more participants felt confident in their ability and believed to have the skills needed to complete the SLUMS. Furthermore, participants have increased knowledge of the importance of cognitive screening. Understanding the necessity to screen for cognitive impairment in primary care settings is essential to manage patients' chronic medical conditions properly.

According to Perry et al. (2018), people with cognitive impairment have higher emergency room visits, admissions, and readmission rates. The increased knowledge noted after the educational intervention should also increase cognitive screening at the clinical practice. As a

result, they should be a higher rate of diagnosis and management of cognitive impairment, which may lead to fewer hospital visits and admissions. The success of this project intervention is contingent on its application in the clinical setting. According to Rycroft-Malone (2004), the context and facilitation of the best evidence into practice are essential to successfully implementing an evidence-based project into practice.

Implications to advanced nursing practice

This DNP QI project presents the challenges healthcare professionals must overcome to improve cognitive screening in clinical settings. Moreover, it reveals the need to train medical staff to screen the cognitive function of patients. Furthermore, it implements an educational program that should help educate the medical staff, increase their clinical skills, and equip them to accurately screen patients' cognitive function. According to Islam et al. (2020), medical staff training in primary care should be ongoing to ensure long-term sustainability. The project's success demonstrates the nurse practitioners' positive role in reshaping the face of healthcare.

Limitations

One of the primary limitations of this intervention was the small sample size. Only eleven participants attended the project. However, since the participants belong to medical centers, it is representatives of the overall medical assistants of the company. Furthermore, another limitation worth mentioning is the integrity of the participants while completing the questionnaire. Because the participants were not monitored, they may have gotten help or seek answers to the questions online; however, this seems unlikely considering they did not have an incentive to participate. Finally, even though the improvement score was satisfactory, time may have been a limitation to the project's overall success. The best time available to have the most participants was ninety minutes before the end of the participants' work shift. Hence, participants may have rushed to answer the questions, which may have caused a lower score improvement score.

Conclusion

Cognitive impairment has been underdiagnosed in primary care. Moreover, it is usually delayed when a diagnosis is made (Romano et al., 2020). Delay in diagnosis may lead to a delay in management, which negatively impacts patients' quality of life. According to the literature, delayed and underdiagnosis of cognitive screening is due to a lack of training on screening tools in the clinical setting. Most primary care providers also reported insufficient training on cognitive screening as a primary barrier to diagnosing and managing cognitive impairment (Mansfield et al., 2019).

According to the Affordable Care Act of 2010, cognitive screening is required during the Medicare annual wellness visit and must be an integral component of a neurologic examination (Silbley et al., 2019). This clinical site adopts the SLUMS, a validated tool, to screen the cognitive function of new patients and patients in whom a change in mentation is noted during annual visits. However, there is no formal training for the medical assistants who perform the screening. Thus, the investigator created a structured educational program on cognitive impairment, the importance of cognitive screening in older patients, and screening accuracy using the SLUMS tailored to the clinical site needs and according to the literature findings.

This doctoral project met its goals of improving medical staff's knowledge, skills, and confidence to screen cognitive function using the SLUMS. As a result, the intervention has improved the scoring accuracy of the SLUMS among the participants. Since using the SLUMS requires ongoing annual training, this project may be used as a continuing education program to train medical staff during orientation and annually. Assessing ways to improve staff's adherence to screening cognitive function should be further investigated.

Dissemination plan

While there is no consensus on a cognitive function screening tool, multiple validated tools with high sensitivity and specificity are recommended to screening for mild cognitive impairment and dementia in older patients. SLUMS is one of these validated tools. This quality improvement project developed an educational intervention to educate medical professionals about cognitive impairment, dementia, and cognitive screening using the SLUMS.

The next step is to publish the literature review and QI project, present the project to the stakeholders and staff. Also, the project will be submitted to the FIU Library Repository. Since there is no current training of the SLUMS at the clinical center, this educational intervention may be used as continuing education for medical staff. Upon implementing the QI project, an ongoing assessment will be done for sustainability and assess the project's benefits.

References

Abd Razak, M. A., Ahmad, N. A., Chan, Y.Y., Mohamad, K. N., Yusof, M., Abdul Ghani, M. K. A., Omar, M., Abd Aziz, F. A. & Jamaluddin, R. (2019). Validity of screening tools for dementia and mild cognitive impairment among the elderly in primary health care: a systematic review. *Public Health*,*169*, 84-92. doi: 10.1016/j.puhe.2019.01.001.

Alzheimer's Association. (2011). *Cognitive impairment: The Impact on health in Florida.* Retrieved from: https://alz.org/media/Documents/florida-cognitive-impairment.pdf

Alzheimer's Association. (2017). *Early detection and diagnosis of Alzheimer's dementia.* Retrieved from: https://act.alz.org/site/DocServer/Policy_Brief_-_Early_Detection_and_Diagnosis_Brief__Assn.pdf?docID=53576

Alzheimer's Association. (2019). Alzheimer's Disease Facts and Figures. *Alzheimers Dement, 15*(3), 321-87. Retrieved from https://www.alz.org/media/documents/alzheimers-facts-and-figures-2019-r.pdf

Alzheimer's Association Report. (2019). *New Alzheimer's Association report shows significant disconnect between seniors, physicians when it comes to cognitive assessment*. Retrieved from https://www.alz.org/news/2019/new-alzheimer-s-association-report-shows-signifi

Athilingam, P., Visovsky, C. & Elliot, F. A. (2015). Cognitive screening in persons with chronic diseases in primary care: Challenges and recommendations for practice. *American Journal of Alzheimer's Disease & Other Dementias, 30*(6) 547-558. DOI: 10.1177/153331751557712

Bui N. A., Adeola, M., Azad, R., Swan, J. T., Agarwal, K. S., Sharma, M., Liebl, M. G. & Taffet G. E (2020). Prevalence of cognitive impairment among elderly patients upon hospital admission using Mini-Cog assessments performed by advanced pharmacy practice experience students. *Journal of Pharmacy Practice, 33*(1), 21-29. doi:

10.1177/0897190018780591.

Cannon, P. & LArner, J. A. (2016). Errors in the scoring and reporting of cognitive screening instruments administered in primary care. *Neurodegenerative disease management, 6*(4), 271–276. Doi: 10.2217/nmt-2016-0004. Epub 2016 Jul 13.

Center for Disease Control and Prevention [CDC]. (2020). *Chronic Diseases in America*. Retrieved from: https://www.cdc.gov/chronicdisease/resources/infographic/ chronic-diseases.htm

Gonzalo, A. (2019). *Faye Abdellah: 21 nursing problems theory*. Retrieved from https://nurseslabs.com/faye-g-abdellahs-21-nursing-problems-theory/

Islam, M. M., Parkinson, A., Burns, K., Woods, M. &Yenb, L. (2020). A training program for primary health care nurses on timely diagnosis and management of dementia in general practice: An evaluation study. *International Journal of Nursing Studies, 105,* 103550. https://doi.org/10.1016/j.ijnurstu.2020.103550

Malmstrom, T. K., Voss, V. B., Cruz-Oliver, D. M., Cummings-Vaugh, L. A., Tumosa, N., Grossberg, G. T. & Morley, J. E. (2015). The Rapid Cognitive Screen (RCS): A point-of-care screening for dementia and mild cognitive impairment. *Journal of Nutrition Health and Aging 19*, 741–744. Retrieved from: https://doi.org/10.1007/s12603-015-0564-2

Mansfield, E., Noble, N., Sanson-Fisher, R., Mazza, D. & Bryant, J. (2019). Primary Care Physicians' Perceived Barriers to Optimal Dementia Care: A Systematic Review. *Gerontologist, 59*(6), e697-e708. doi: 10.1093/geront/gny067

McLeod, S. A. (2019). *Likert scale*. *Simply Psychology*. Retrieved from: https://www.simplypsychology.org/likert-scale.html

Melnyk, B. M., Fineout-Overholt, E., Stillwell, S. B., & Williamson, K. M. (2019). *Evidence-*

based practice in nursing and healthcare: A guide to best practice. Philadelphia, PA:

Wolters Kluwer.

Moran, K., Burson, R. & Conrad, D. (2014). *The Doctor of nursing practice scholarly project: A framework for success.* Burlington, MA: Jones & Bartlett Learning

Murdoch, M., Simon, A. B., Polusny, M. A., Bangerter, A. K., Grill, J. P., Noorbaloochi, S. & Partin, M. R. (2014). Impact of different privacy conditions and incentives on survey response rate, participant representativeness, and disclosure of sensitive information: a randomized controlled trial. *BMC Medical Research Methodology, 16*, 14:90. doi: 10.1186/1471-2288-14-90.

Newman, J. G. C., Bevinsb, A. D., Zajicekc, J. P., Hodges, R. J., Vuillermoze, E., Dickensonb, M. J., Kellyb, S. D., Brownf S. & Noad, F. R. (2018). Improving the quality of cognitive screening assessments: ACEmobile, an iPad-based version of the Addenbrooke's Cognitive Examination-III. *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring, 10*, 182-187 https://doi.org/10.1016/j.dadm.2017.12.003

Romano, R. R., Carter, M. A., Anderson, A. R. & Monroe, T. B. (2020). An integrative review of system-level factors influencing dementia detection in primary care. *Journal of the American Association of Nurse Practitioners, 32*(4), 299–305. doi: 10.1097/JXX.0000000000000230.

Rycroft-Malone, J. (2004). The PARIHS framework: A framework for guiding the implementation of evidence-based practice. *Journal of Nursing Care Quality, 19*(4), 297– 304.

Saint Louis University. (2020). *SLU Mental Status Exam.* Retrieved from

https://www.slu.edu/medicine/internal-medicine/geriatric-medicine/aging-

successfully/assessment-tools/mental-status-exam.php

Silbley, R. S., Strout, K. & Poirier, P. (2019). Screening for Cognitive Decline in Primary Care.

Clinical Advisor. Retrieved from:

https://www.clinicaladvisor.com/%20home/topics/neurology-information-

center/screening-for-cognitive-decline-in-primary-care/

Tariq, S. H., Tumosa, N., Chibnall, J. T., Perry, M. H. 3rd & Morley, J. E. (2006). Comparison

of the Saint Louis University Mental Status examination and the Mini-Mental State

Examination for detecting dementia and mild neurocognitive disorder—a pilot study.

American Journal of Geriatric Psychiatry,14(11),900-910. doi:

10.1097/01.JGP.0000221510.33817.86

William, K. M. T. (2020). *Research methods knowledge base: Descriptive analysis.* Retrieved

from: https://conjointly.com/kb/descriptive-statistics/

Wong, W. (2020). Economic burden of Alzheimer Disease and managed care considerations.

American Journal of Managed Care, 26, S177-S183.

https://doi.org/10.37765/ajmc.2020.88482

Appendix A: Letter of support

IMC HEALTH
MEDICAL CENTERS

Date: 01/28/2021

Charles P. Buscemi, PhD, APRN
Clinical Associate Professor
Nicole Wertheim College of Nursing & Health
Sciences Florida International University

Dear Dr. Buscemi:

Thank you for inviting IMC Health to participate in the DNP Project of Wilfrance Celestin. I understand that this student will be conducting this project as part of the requirements for the Doctor of Nursing Practice program at Florida International University (FIU). After reviewing the project's proposal titled *"Educational intervention to improve cognitive screening in primary care: A quality improvement project."* I have warranted him permission to conduct the project in this company.

We understand that the project will be developed in our setting and will occur in one session, and probably be implemented afterward. We are also aware of our staff participation in supporting the student to complete this project, including grant the student access to our facilities, give consent, deliver the pre-test questionnaire, provide the educational intervention and the posttest questionnaire to the recruited participants. We will provide a peaceful and safe environment to safeguard our participants' privacy and adequate area to conduct the educational activity.

This project intends to evaluate if a structured educational program targeting medical assistants will increase cognitive screening in primary care. Before implementing this project, the

Florida International University Institutional Review Board will evaluate and approve the procedures to conduct the project. Evidence suggests that training on cognitive screening tools in a primary care setting should be ongoing to ensure long-term sustainability and improve practice. Furthermore, the authors of the SLUMS require medical professionals to have an annual refresher by watching the Veterans Affairs' training video on the SLUMS administration. Successful training on cognitive screening and the SLUMS will improve our patient's healthcare indicators and improve patients' quality of life.

The educational intervention will be done via zoom or Microsoft team and will last 40-60 minutes. The student will provide the educational materials to each participant. Any data collected by Wilfrance Celestin will be kept confidential and stored in a password-protected computer.

We expect that Wilfrance Celestin will not interfere with the normal office performance. Furthermore, Mr. Celestin will behave professionally and follow the office standards of care. As the Medical Director of IMC Health, I support our medical assistants' participation in this project and look forward to work with you.

Sincerely,

Pablo Alonso, MD
Medical Director
IMC Health

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Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Charles Buscemi
CC: Wilfrance Celestin

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: February 19, 2021

Protocol Title: "Educational intervention to improve cognitive screening in primary care: A quality improvement project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #:   IRB-21-0057   **IRB Exemption Date:**   02/19/21
TOPAZ Reference #:   110066

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.
MMV/em

Appendix C: Letter of recruitment

Recruitment Email for an educational intervention to improve cognitive screening in primary care: A Quality Improvement Project

Dear medical assistants,

My name is Wilfrance Celestin, and I am a student from the Graduate Nursing Department at Florida International University. I am writing to invite you to participate in my quality improvement project. The goal of this project is to implement an educational intervention to improve knowledge of cognitive screening in primary care. You are eligible to take part in this project because you are a medical assistant at IMC Health. I am contacting you with the permission of the Medical Director, Dr. Pablo Alonso.

If you decide to participate in this project, you will be asked to complete and sign a consent form for participation. Next, you will complete a pre-test questionnaire, which is expected to take approximately 15-20 minutes. You will then complete the SLUMS while watching a six-minute video of a healthcare provider administering the test. Afterward, you will be asked to watch an educational presentation online of about 20 minutes on cognitive impairment and the SLUMS. After watching the video, you will complete the SLUMS again while watching the same previous six-minute video. Finally, you will be asked to complete the post-test questionnaire, which is expected to take approximately 15-20 minutes. The above steps, consent, pretest-posttest participation, and intervention will be done virtually and online using Qualtrics. No compensation will be provided.

As a reminder, this training is voluntary. You can choose to be in the study or not. If you would like to participate or have any questions about the study, please email or contact me at wcele003@fiu.edu or 239-789-7893.

Thank you very much for your anticipated participation.

Sincerely,

Wilfrance Celestin

FIU | FLORIDA INTERNATIONAL UNIVERSITY

CONSENT TO PARTICIPATE IN A QUALITY IMPROVEMENT PROJECT
"Educational intervention to improve cognitive screening in primary care."

PURPOSE OF THE PROJECT

You are being asked to be in a quality improvement project. The goal of this project is to improve cognitive screening in primary care by implementing an educational program to train medical assistants on cognitive impairment and on the proper use of the cognitive assessment tool, the Saint Louis University Mental Status (SLUMS).

NUMBER OF PROJECT PARTICIPANTS

If you decide to be in this project, you will be one of ten people participating in this research project.

DURATION OF THE PROJECT

Your participation will require about 60-90 minutes of your time.

PROCEDURES

If you agree to be in the project, we will ask you to do the following things:

1. complete a demographic questionnaire, which includes general information such as age, gender and a pre-test questionnaire on cognitive impairment and the SLUMS.
2. You will complete the SLUMS while watching a six-minute video of a healthcare provider administering the test before the training and after the training.
3. You will be asked to watch an educational presentation online on cognitive impairment and the SLUMS.
4. You will be asked to complete the post-test questionnaire.

The above steps, consent, pretest-posttest participation, and intervention will be done virtually and online using Qualtrics.

RISKS AND/OR DISCOMFORTS

There are no foreseeable risks with you for participating in this project.

BENEFITS

The following benefits may be associated with your participation in this project: An increase in knowledge about cognitive impairment and the SLUMS administration, which will help you to accurately screening the cognitive function of patients. The overall objective of the program is to increase the quality of healthcare delivery and increase medical assistants' skills.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this project. However, if you like to receive the educational material given to the participants in this project, it will be provided to you at no cost.

CONFIDENTIALITY
The records of this project will be kept private and will be protected to the fullest extent provided by law. If, in any sort of report, we might publish, we will not include any information that will make it possible to identify you as a participant. Records will be stored securely, and only the project team will have access to the records.

COMPENSATION & COSTS
There is no cost or payment to you for receiving the health education and/or participating in this project.

RIGHT TO DECLINE OR WITHDRAW
Your participation in this project is voluntary. You are free to participate in the project or withdraw your consent at any time during the project. Your withdrawal or lack of participation will not affect any benefits to which you are otherwise entitled. The investigator reserves the right to remove you without your consent at such time that they feel it is in the best interest.

RESEARCHER CONTACT INFORMATION
If you have any questions about the purpose, procedures, or any other issues relating to this research project, you may contact Wilfrance Celestin at 239-789-7893, wcele003@fiu.edu or Dr. Charles Buscemi at 305-348-4870, cbuscemi@fiu.edu.

IRB CONTACT INFORMATION
If you would like to talk with someone about your rights of being a subject in this project or about ethical issues with this project, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT
I have read the information in this consent form and agree to participate in this project. I have had a chance to ask any questions I have about this project, and they have been answered for me. I understand that I will be given a copy of this form for my records.

_____   _____
Signature of Participant   Date

_____
Printed Name of Participant

_____   _____
Signature of Person Obtaining Consent   Date

Appendix E: Cognitive screening pretest posttest questionnaire

Cognitive screening PRETEST-POSTTEST questionnaire

This questionnaire is a vital part of a DNP quality improvement project aiming at educating medical assistants to improve cognitive screening in primary care setting.

Instructions:
1. Please do not write your name or other personal information on this questionnaire
2. Your answers are anonymous and will be kept confidential

These questions will help to assess your knowledge and confidence on cognitive impairment and the use of the SLUMS.

Demographic

Gender: _____

Age: _____

Ethnicity:_____

Position:_____

Please, answer to the best of your knowledge.

1. Have you received any type of training on the SLUMS?

_____No   ____yes

  If yes, how long ago? _____Month(s)

Confidence and Skills to use the SLUMS

2. Please respond to the following statements:

Statement	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
It very important to assess the memory of patients 60 years and older at least once a year?					
I have the necessary skills to administer the SLUMS correctly.					
I am confident in my ability to administer the SLUMS.					
During triage, I ask all patients 60 years and older if they have a change in memory.					

Knowledge on cognitive screening and the SLUMS

3. How would you rate your knowledge on cognitive impairment?

   very poor   poor   fair   good   excellent.

4. How would you rate your knowledge on the importance of cognitive screening in primary care?

   very poor   poor   fair   good   excellent.

5. How would you rate your knowledge on the role of the SLUMS?

very poor   poor   fair   good   excellent.

Knowledge of cognitive impairment/dementia/Alzheimer's disease

6. Is it acceptable to ask family member about the patient's memory?

   ☐True   ☐False   ☐ I'm not sure

7. Cognitive impairment is a normal part of the aging process.

   ☐True   ☐False   ☐ I'm not sure

8. People with cognitive impairment are more likely to be hospitalized than people with other chronic disease.

   ☐True   ☐False   ☐ I'm not sure

9. Causes of cognitive impairment are easily identifiable.

   Strongly agree   Agree   Undecided   Disagree   Strongly disagree

10. There are at least 16 million of people in the US living with cognitive impairment.

    ☐True   ☐False   ☐ I'm not sure

11. Cognitive impairment affects everyone in the same way.

    ☐True   ☐False   ☐ I'm not sure

    1-10   11-20   21-30   more than 30
12. Individuals with cognitive impairment may experience which of these symptoms?

    Select all that apply
    ☐ Emotional

    ☐ Physical

    ☐ Memory

    ☐ Cognitive & Physical

    ☐ I don't know

13. What are 3 signs and symptoms of cognitive impairment/dementia/Alzheimer's Disease

    a.

    b.

    c.

14. In cognitive impairment there is a change in which of these areas? *Select all that apply*

a) Thinking

b) Memory

c) Reasoning

d) Only A and B

e) All of the above.

15. Which of the following is the greatest risk factors for Alzheimer's Disease?

a) Family history

b) Sex

c) Age

d) Gender

e) None of the above

16. What are the most common risk factors for A.D?

    a. Genetics

    b. family history

    c. age

    d. female gender

    e. all of the above

17. Which populations are at higher risk of developing A.D? *Select the correct answer.*

a) Men, Hispanics, African Americans

b) Asians, women, Native Americans

c) Hispanics, Woman, African Americans

d) African Americans, Men, Hispanics

18. Which of these statements are true? *Select all that apply.*

a. Every 65 seconds someone develops A.D in the US

b. Alzheimer's disease is the 6 leading causes of death in the US

c. Alzheimer's disease kills more people than breast and prostate CA combine.

d. All of the above.

SLUMS and its benefits

19. Using the SLUMS will help to:

Select all that apply

☐ Identify patients at risk cognitive impairment and Alzheimer's Disease.

☐ Identify medications that may affect cognition.

☐ Assess further for causes of cognitive impairment.

☐ Provide timely referral to neurologist.

20. The SLUMS must be completed:

    a. New Medicare patients 65 years and older

    b. Anytime when there is a change in memory.

    c. If there is memory change during any visit

    d. A and C

    e. All the above

21. The SLUMS is a tool used to assess for:

    a) Mild cognitive impairment

    b) Patient's skills and education

    c) Dementia

    d) A and B

    e) A and C

22. Using the SLUMS to assess patients' cognition is important for the following reason?

a) Timely diagnosis for cognitive impairment

b) Helps patients to receive appropriate information about diagnosis

c) Helps patients to receive support and treatment to improve their quality of life.

d) All of the above

23. In the past week, how many times did you ask patients about their memory?

       1-10   11-20   21-30   more than 30

24. In the past week, how many times did you complete the SLUMS?

       1-10   11-20   21-30   more than 30

Administration of the SLUMS

25. What should you do once complete the SLUMS?

    a. Discuss the result with the patient and take the form to the PCP

    b. Place the form to be index in the patient's chart

    c. Take the form to the Primary care provider

    d. All of the above.

26. Choose the correct answer.

When administering the SLUMS, you must:

a) read the questions clearly and fast, so the patient does not trick you

b) read the question clearly and slowly.

27. Please respond to the following statements:

Statement	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
When using the SLUMS, I must record the number of years the patient attended school.					

If the patient has an associates, bachelor's, master's or doctorate degree, I must write it on the form.					
When administering the SLUMS, I must determine if the patient is a fully awake and able to focus.					
When administering the SLUMS, I should not put my name on the form.					

Appendix F: Saint Louis University Mental Status (SLUMS)

VAMC
SLUMS EXAMINATION

Questions about this assessment tool? E-mail aging@slu.edu

Name_____ Age_____

Is the patient alert?_____ Level of education_____

__/1	**1** 1. What day of the week is it?
__/1	**1** 2. What is the year?
__/1	**1** 3. What state are we in?
	4. Please remember these five objects. I will ask you what they are later.
	Apple Pen Tie House Car
__/3	5. You have $100 and you go to the store and buy a dozen apples for $3 and a tricycle for $20. **1** How much did you spend? **2** How much do you have left?
__/3	6. Please name as many animals as you can in one minute. **0** 0-4 animals **1** 5-9 animals **2** 10-14 animals **3** 15+ animals
__/5	7. What were the five objects I asked you to remember? 1 point for each one correct.
__/2	8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24. **0** 87 **1** 648 **1** 8537
__/4	9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock. **2** Hour markers okay **2** Time correct
	1 10. Please place an X in the triangle.
__/2	**1** Which of the above figures is largest?
__/8	11. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it. Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after. **2** What was the female's name? **2** What work did she do? **2** When did she go back to work? **2** What state did she live in?

_____ **TOTAL SCORE**

SCORING

HIGH SCHOOL EDUCATION		LESS THAN HIGH SCHOOL EDUCATION
27-30	NORMAL	25-30
21-26	MILD NEUROCOGNITIVE DISORDER	20-24
1-20	DEMENTIA	1-19

_____   _____   _____

CLINICIAN'S SIGNATURE   DATE   TIME