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Screening for Unhealthy Alcohol Use:

Implementation of Screening and Brief Intervention (SBI) in Primary Care using the AUDIT-C

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Abstract

Background: In 2021, the NIAAA reported that alcohol use disorder affected 29.5 million Americans. Alcohol Screening and Brief Intervention (SBI) is an evidence-based prevention strategy, recommended by the USPSTF, to reduce alcohol consumption. Unfortunately, less than 50% of patients receive advice from their provider about the harms of excessive alcohol use. This study aimed to implement an effective SBI process in a rural primary care setting utilizing the Alcohol Use Disorders Identification Test—Consumption (AUDIT-C) tool while addressing known barriers to proper implementation.

Methods: Donabedian's Structure-Process-Outcome (SPO) framework for Quality Assessment guided this quality improvement design. Intervention planning included considerations for how closely the three components are related and affect each other. This project used a mixed methods convergent design to evaluate an intervention designed to increase the use of SBI in a primary care setting. Reviewed data included the rate of screenings, number of positive screenings, and frequency of completed brief interventions.

Interventions: Before implementing the new SBI process, providers and ancillary staff attended an in-person education session. The EMR populated the AUDIT-C screening tool into patient charts that were scheduled for an annual wellness or annual Medicare visit. Brief interventions were to be conducted for patients with a positive screening, nevertheless, the option to complete that step and how to complete the intervention was left to the discretion of each provider. Provider and ancillary staff completed pre- and post-implementation surveys to further assess screening practices and provider perceptions of barriers and facilitators to screening.

Results: The screening rate with AUDIT-C was 78.0% compared to 98.0% with the method utilized before the initiative. However, the overall rate of positive screenings doubled with the use of AUDIT-C. Audited charts did not include documented data to suggest that a brief intervention occurred pre- or post-intervention. Survey responses showed that most providers (54.5%) were only slightly familiar with the USPSTF recommendations for SBI, but the same number also indicated that their role in screening was very important. Most ancillary staff (72.7%) responded that they neither agreed nor disagreed that the use of AUDIT-C increased the time it took to complete their job. Providers reported time and patient-related factors (ex. discomfort and truthfulness) as barriers to screening with AUDIT-C.

Conclusions: The provision of brief intervention as part of SBI continues to face challenges despite an increased identification of patients with unhealthy alcohol use utilizing the AUDIT-C tool. Ensuring that providers have adequate knowledge is an important next step to increase their ability to perform brief intervention with increased frequency. Further studies that offer suggestions for overcoming perceived barriers should help increase the utilization of SBI in primary care.

Keywords: unhealthy alcohol use, alcohol use disorder, alcohol screening, brief intervention, barriers to screening, alcohol-related disease, prevention, quality improvement, primary care

Screening for Unhealthy Alcohol Use:

Implementation of Screening and Brief Intervention in Primary Care Using AUDIT-C

Introduction

Data from the Centers for Disease Control (CDC) indicate that excessive alcohol use leads to 178,000 deaths each year in the United States while creating an economic burden of as much as 249 billion dollars per year (2024). The 2021 National Survey on Drug Use and Health (NSDUH) showed that 29.5 million Americans were diagnosed with alcohol use disorder (AUD), a medical condition characterized by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences (Center for Behavioral Health, 2021; NIAAA, 2023). According to the World Health Organization (2022), 7.7% of deaths in males and 2.6% in females are attributable to AUD globally. Chronic diseases commonly associated with AUD include liver disease, heart disease, and various cancers including colorectum for males and breast cancer for females (CDC, 2024; WHO, 2020). In the United States, 75,000 cancer cases and 19,000 cancer deaths can be linked to alcohol each year (Goding Sauer et al., 2021).

During the pandemic, 2020 alcohol sales rose by 3%, their largest increase in 50 years (U.S. Department of Health and Human Services, 2022). Grossman et al. (2020) conducted a study on alcohol consumption during the pandemic and found that 60% of participants indicated increased consumption. Estimates from research conducted in 2021 led by Massachusetts General Hospital indicated that excessive drinking, which increased by 21% during the pandemic, may lead to increased mortality should the levels remain sustained (Julien et al., 2021). However, a 2022 study concluded that cessation of alcohol that is sustained or a reduction

in consumption from heavy to moderate could potentially decrease the risk of alcohol-related diseases including cancers (Yoo et al., 2022).

To reduce alcohol-related harms, multiple organizations along with the U.S. Preventive Services Task Force (USPSTF) recommend screening and brief intervention (SBI) as a public health strategy (SAMHSA, 2016; Curry et al., 2018). The CDC defines SBI as a validated set of screening questions to identify patients' drinking patterns and a short conversation with patients who are drinking more than the recommended amounts, as well as referral to treatment when appropriate (2023). USPSTF conducted a review of evidence regarding SBI and concluded that there is a moderate net benefit that can lead to a reduction in unhealthy alcohol use (Curry et al., 2018). SBI use in primary care settings has been shown to reduce the consumption of alcohol by an average of 17% per week (Rahm et al., 2015). Primary care providers should address patients' unhealthy alcohol use through screening and brief intervention with a validated tool to be the most effective (Currey et al., 2018).

Despite the evidence to suggest that proper SBI can address unhealthy drinking and lead to proper treatment for patients with alcohol dependence or AUD, screening and intervention are not routinely provided nor are verified screening tools utilized when asking patients about their alcohol consumption (Bazzi & Saitz, 2018). In data reviewed from 2015-2019, the CDC noted that only 1 of every 6 patients reported discussing alcohol use with their provider and that just 2.6% of visits utilized a validated questionnaire (Alcohol screening, 2016). Subsequent data from the National Survey on Drug Use and Health published in 2021 shows that just 11.6% of patients received a brief intervention after screening (Mintz et al., 2021). The recommendation for SBI has been in place for decades and studies consistently show that many primary care providers

have not adapted their practice to comply with the guidelines provided by the USPSTF (Liu et al., 2019; McKnight et al., 2020).

Review of Literature

A recommendation supported by the USPSTF for screening and brief counseling (intervention) of all adult patients seen in primary care has been in place since 1996. (Problem drinking: Screening, 1996). The recommendation statement was last updated in 2018 and reads:

The USPSTF recommends screening for unhealthy alcohol use in primary care settings in adults 18 years or older, including pregnant women, and providing persons engaged in risky or hazardous drinking with brief behavioral counseling interventions to reduce unhealthy alcohol use” (Curry et al., 2018, p. 1900).

USPSTF rates this as a Grade B recommendation, indicating that there is high certainty that the net benefit is moderate, meaning there is sufficient evidence to determine the effects of this preventive service on health outcomes. USPSTF recommendations are assigned one of five letter grades (A, B, C, D, or I), to indicate the strength of the recommendation, and those with A or B grades should be offered or provided to patients routinely. Screening assists providers in identifying those with evidence of alcohol use disorder and brief intervention can lead to a reduction in consumption. The USPSTF does not recommend a specific brief intervention, though it commonly consists of general feedback on reducing alcohol use or cognitive behavioral counseling and strategies. They have recommended using a validated screening tool for the best accuracy in determining alcohol dependence or harmful drinking. The screening tools include AUDIT-Consumption Questions (AUDIT-C), the NIAAA Single Alcohol Screening Question (SASQ), and the Cut down, Annoyed, Guilty, Eye-opener (CAGE) tool (Curry et al., 2018). The USPSTF states that AUDIT-C has been shown to have both high sensitivity (83%) and

specificity (90%) for detecting unhealthy alcohol use in multiple populations for men and women (Curry et al., 2018; Bush et al., 1998). Alcohol SBI is ranked 4th in clinical preventive services with a 4/5 score for clinically preventable burden (CPB) and a 5/5 score for cost-effectiveness (CE) (CDC, 2014). The CPB score means that if alcohol SBI was delivered to its full targeted audience, it would have a high impact on preventable disease, injury, and premature death caused by alcohol use (CDC, 2014).

Problem Description

Inadequate Implementation

Even with an ongoing recommendation for primary care providers to conduct SBI, the level of implementation has remained inadequate. Liu et al (2019) found that between 40-46% of health plan members had documented alcohol screening. A 2020 analysis of data from the Behavioral Risk Factor Surveillance System (BRFSS) noted that 81.4% of adults reported being asked about alcohol use during a checkup (McKnight et al., 2020). Unfortunately, both studies have revealed inconsistent use of standardized screening tools, which attenuates the effectiveness of addressing unhealthy alcohol use (Liu et al., 2019; Mcknight et al., 2020). The brief intervention has been poorly implemented, despite a positive screening in some patients, with less than 46% of patients being advised about the harms of drinking or having any follow-up care (Liu et al., 2019; McKnight et al., 2020). Further information suggests that only 19% of patients were advised to reduce their drinking despite regular chronic consumption (Sahker and Arndt, 2017).

Challenges to Implementation

With the implementation of SBI far below ideal levels, researchers have attempted to explore the reasons for the inconsistency. Barriers to implementation are numerous and

dependent on a variety of variables within a particular practice. For a large majority of providers, time and knowledge are cited as obstacles in the struggle to implement screening and intervention (Bazzi and Saitz, 2019; Rahm et al., 2016; Agley et al., 2016). According to a 2021 review of 28 studies, time includes two main issues, with providers concerned about competing priorities to manage complex patients and how long the process of SBI will take to complete (Rosario et al., 2021). A second common barrier mentioned is a lack of knowledge on the topics associated with SBI (Agley et al., 2016; Bazzi and Saitz, 2018; Rahm et al., 2016; Rosario et al., 2021). Many providers and nurses believe that they would benefit from increased knowledge about alcohol guidelines in addition to better training on SBI (Rosario et al., 2021). Further concerns are raised by both providers and nurses relative to resource availability to properly perform the screening including the proper tools and material for intervention or counseling patients (Bazzi and Saitz, 2018; Rosario et al., 2021).

Addressing Implementation Challenges

As efforts to increase the implementation of SBI continue, studies have been conducted to help identify methods that can lead to increased utilization by primary care providers. Training and education are the most employed strategies to implement SBI, as they have a two-fold benefit; both increased knowledge of SBI and increased confidence in the ability to perform SBI (Agley et al., 2016). Understanding the importance of this strategy, The Substance Abuse and Mental Health Services Administration (SAMHSA) has a grant with the sole purpose of increased education of medical professionals regarding the use of screening, brief intervention, and referral to treatment (SBIRT) (Tholele et al., 2021). The increased confidence gained in training has been shown to impact the frequency of both the screening and the intervention

(Agle et al., 2016). This increase was noted with physicians and nurses who had training sessions (Thoele et al., 2021).

Rationale

The purpose of this project was to improve the quality of preventive care in a primary care setting. The clinical setting has an identified structure, unique processes for providing care, and related outcomes resulting from that care. Therefore, Donabedian's Structure-Process-Outcome (SPO) Model was selected as a guiding framework (see Figure 1). According to Donabedian (2005), the outcome measure serves as the validator for quality and effectiveness despite the interconnectedness of the components. Any interventions that target structure or process have the potential to influence one another and outcomes (Donabedian, 2005). A meeting with the primary stakeholder helped identify the current structure and process associated with screening patients for alcohol use in the planned primary care setting. The assessment found that the current process, or method of screening for alcohol misuse, did not include a validated screening tool. Therefore, the primary intervention of this project focused on the process component of SPO; instituting a standardized screening process for designated patients to screen for unhealthy alcohol use. The predicted result of updating the screening process with the validated tool would be a more effective identification of patients with unhealthy alcohol use or an increase in positive screening. The calculated rate of screenings served as the indicator of an effective process change (CDC, 2014). Increasing the effectiveness of the process should lead directly to an increase in intended effects (Busse et al., 2019). Thus, if staff conducted screenings as intended, unhealthy alcohol use would be identified, and providers would conduct a brief intervention for applicable patients. Analysis of process results, as referenced by Donabedian (2005), can indicate whether healthcare delivery is optimal. The frequency of patients who received an

intervention after having a positive screening is indicative of the improved provision of care for unhealthy alcohol use.

Because Donabedian's (2005) model shows the close association between structure and process, structure components relevant to the new process received consideration before the implementation of the intervention. The structure includes inputs that aid in the provision of care including material, intellectual, and human resources (Busse et al., 2019). With the assistance of information technology, adjustments to the EMR already in use integrated the validated screening tool into the electronic documents for the designated patient visits. Inclusion of the tool into the EMR may help simplify the implementation of the updated screening process. Knowledge deficit is a known barrier to the implementation of new screening tools (Bazzi and Saitz, 2019; Rahm et al., 2016; Agle et al., 2016). Because this is true, education sessions were offered for both providers (MDs, APRNs, and PAs) and ancillary staff (RNs, LPNs, and MAs) as an additional way of addressing the practice structure components to increase the probability of a successful implementation.

As previously stated, outcome measures may result from improvement in structure and process. Within healthcare settings, those outcome measures are indicators of positive impact on patients. Donabedian (2005) included both final and intermediate outcomes in the effects of quality healthcare. For this project, the "outcome" focused on indications of improvement to the system versus its effect on final patient outcomes overall. It is hoped that system improvement will ultimately result in improved patient outcomes. Those outcomes would include referral to treatment, decreased alcohol consumption, and decreased incidence of chronic disease, though not addressed in this setting.

While an understanding of structure, process, and outcome measures was critical to conducting this quality improvement project, another measure of quality improvement (QI) played a valuable role in evaluating the project outcomes. Donabedian's SPO Model (2005) does not address balancing measures despite recognition as another common fourth component of QI (Jazieh, 2020). Process and outcome measures show improvement related to the project intervention, but identification of unintended consequences related to the change(s), or balancing measures, is vital to quality improvement efforts. (Jazieh, 2020). Qualtrics-based surveys before and after the intervention gauged provider and staff perceptions of the screening process. The inclusion of qualitative and quantitative responses clarified perceptions and assessed for any balancing measures, positive or negative, of the new screening method. Plausible negative balancing measures for this project include increased time to complete job tasks and dislike of and/or discomfort with the new process.

Specific Aims

With the overall purpose of improving the implementation of SBI in primary care, a practice was identified that had not previously established a screening process for unhealthy alcohol use. In this practice, patients have traditionally been asked a single non-validated question regarding their level of alcohol consumption during the intake process. No standard process was in place for clarifying which patients should receive additional screening, counseling, or referral to treatment following intake, instead, follow-up was at the individual providers' discretion. The quality improvement project aimed to implement the use of SBI with a validated screening tool within a primary care practice and to assess its effectiveness in identifying patients with unhealthy alcohol use leading to the provision of appropriate interventions or referrals to treatment, while employing methods to mitigate commonly known

barriers to implementation as identified in the literature review (staff knowledge, time, and resource availability) by assessing provider and ancillary staff perceptions of the updated process.

Methods

This project was a quality improvement design conducted in a primary care practice to address screening and brief intervention (SBI) for unhealthy alcohol use. A new standardized screening process using a validated tool was implemented to improve the detection of unhealthy alcohol use among the clinic's patients. Implementation was partly guided by the CDC's Planning and Implementing Screening and Brief Intervention for Risky Alcohol Use: A Step-by-Step Guide for Primary Care Practices (2014). The study was conducted in a single primary care practice from August 2023 to November 2023.

Before the planned intervention, the primary care practice utilized a screening method that was not in keeping with current recommended standards. Alcohol use was assessed by the ancillary staff while completing the social history review during patient intake. A single EMR-embedded question, "What is your level of alcohol consumption?" was asked of each patient with prepopulated answers of none, occasional, moderate, or heavy as available responses. Most of the ancillary staff completed only the embedded question, while a small portion of the staff included a chart note (8 out of 50 audited charts) that clarified the patients' answers. Staff notes included items such as how often the patient drank an alcoholic beverage, what type of alcohol was consumed, or if they had quit drinking altogether. Each provider could review the patient's responses before completing the patient visit, and then decide if additional discussion about alcohol use was needed or if the patient's alcohol use warranted referral to the social worker.

With no standardized process for screening patients or clear indications for intervention, results were inconsistent across providers and effectiveness was hard to gauge.

AUDIT-C (see Appendix C) was chosen for the new screening process because it has been deemed an accurate tool for the assessment of unhealthy alcohol use by adults 18 and older by the USPSTF (2018). Original studies during the development of AUDIT-C indicated that the screening tool has both high sensitivity and specificity in detecting heavy drinking and active AUD (Bush et al., 1998). A recent 2021 study showed sensitivity and specificity remain similar for men (99.3/77.8%) and women (91.7/ 77.4%) in identifying alcohol misuse (Seth et al., 2015). Screening with AUDIT-C consists of asking three questions that discuss the frequency of alcohol use, the typical amount of use, and how many occasions of heavy use with a total score ranging from 0-12. Scores of 4 or more for men and 3 or more for women indicate a positive screening.

Clinical/Practice Setting

The setting for this project was a primary care practice located in a rural city in the Southern United States with a population of approximately 17,000. Located within the city limits is also a sizeable university with a student population of just over 10,000. While primary care services are offered by other providers in town, this primary care office is affiliated with the local hospital. Their office is housed in a medical building attached to the main hospital campus. Services include a walk-in clinic that will treat children for acute needs, but only adults 18+ are seen by providers for routine visits.

Project Population

For this project, the target population was staff employed by the primary care practice directly involved in the process of screening patients and/or providing intervention during routine visits. The staff consisted of providers and ancillary staff practicing with the following

credentials: medical doctor (MD), physician assistant (PA), advanced practice registered nurse (APRN), registered nurse (RN), licensed practical nurse (LPN), and medical assistant (MA). At the time of the project, primary care services were provided by four MDs, nine APRNs, and one PA. The staff who assisted with patient intake were one MA, three RNS, and ten LPNs. Duration of employment at the office was not considered as inclusion or exclusion criteria.

Intervention

Before the proposed implementation of a new screening method using SBI with the AUDIT-C screening tool, pre-surveys were sent to all staff involved in screening including MDs, PAs, APRNs, RNs, LPNs, and MAs. A mixed-method version of the survey was sent to providers including MDs, APRNS, and PAs (See Appendix A), and a quantitative-only version was sent to ancillary staff including RNs, LPNs, and MAs (See Appendix B). Survey questions were structured as Likert scale responses to evaluate the knowledge and perceptions of ancillary staff and providers relative to screening for alcohol misuse. Additional open-ended survey items were included for providers to identify specific barriers or facilitators to the screening process that were unique to this primary care office. The surveys were distributed to all employees by the primary stakeholder using Qualtrics two weeks before the planned education session. One reminder to complete the surveys was sent via email by the primary stakeholder during the two-week availability period. All surveys closed at midnight, the day prior to the planned education session, to ensure that responses were not affected by the provided education material. While surveys were conducted anonymously to encourage open and complete responses, participants were provided with a particular method of developing a unique identifier that they could remember which will enable responses collected at two distinct time periods to be matched.

An in-person education session was conducted during the monthly staff meeting which was scheduled for the second Tuesday of the month. One session was conducted with the providers and a separate meeting was conducted with the ancillary nursing staff. While the ancillary staff included all 14 employees, the provider meeting was not fully attended. The sessions were 20-30 minutes long with time provided for questions and answers. Educational material was provided to each employee which included printed PowerPoint slides, Athena EMR information about the screening tool, and screenshots of the tool within the EMR for review. Extra copies of each item were left for those providers who were absent for later review. The PowerPoint slide printouts included statistical data related to alcohol use, current guidelines for consumption, diseases related to unhealthy alcohol use, information on current recommendations for screening, education on screening and brief intervention using AUDIT-C, what constitutes a positive screening, and information about the proposed project including project aims. Additional information was included in the presentation for providers about what constitutes a brief intervention following a positive screening. Providers were encouraged to include information, as a notation in their charting, regarding what, if any, intervention was provided with education/discussion, brief intervention, or referral as potential options. Although not all providers were in attendance, all staff were sent the post-implementation survey since printed material was provided for their review. The elements chosen for the educational material were based on suggestions from the CDC Planning and Implementing Screening and Brief Intervention for Risky Alcohol Use: A Step-by-Step Guide for Primary Care Practices (2014), with adaptations made based on the clinic setting as recommended.

Screening and brief intervention (SBI) with the AUDIT-C screening tool was initiated for patients seen by the practice for annual wellness visits and annual Medicare visits the day

following the education sessions. To ease the completion of screening patients in a timely fashion, the AUDIT-C tool was populated into charts for all annual wellness visits and annual Medicare visits. Because of the electronic medical record setup, the screening tool could not auto-populate into new patient visits, but the providers were encouraged to complete the screening and had the option to add AUDIT-C into the visit as indicated. The initial screening was conducted by ancillary staff during patient intake for visits that included the auto-populated tool. Screening for alcohol misuse with AUDIT-C consisted of three questions that discuss the frequency of alcohol use, the typical amount of use, and how many occasions of heavy use with a total score ranging from 0-12. Scores of 4 or more for men and 3 or more for women, would indicate a positive screening. Following the intake screening, providers reviewed the populated scores and could then opt to provide the full AUDIT questionnaire or any needed intervention(s) as appropriate for each patient.

After completing four weeks utilizing SBI with AUDIT-C, a post-survey was distributed to providers (see Appendix D) and ancillary staff (see Appendix E) using similar timing and methods as the pre-survey to measure concepts and perceptions relative to the new process. The survey mirrored the pre-survey as closely as possible such that comparisons between the two methods of screening were more directly made. Utilizing the unique identifier created by each participant allowed for analysis of how many staff members responded to each version of the survey. Noting this information may assist in presenting relevant information on the effectiveness and success of the new process directly compared to the previous method.

Study of the Intervention

A retrospective chart audit was conducted for pre- and post-intervention data on adult patients who were seen by primary care services to assess the effectiveness of screening for

alcohol misuse. The audit included adult patients seen for annual wellness exams, annual Medicare visits (new or established), and new patient visits. The pre-intervention period included two full weeks before the implementation of SBI. Fifty random patients were identified for the audit by date (8/29/23-9/8/23) and CPT codes (99386, 99396, 99395, G0439, G0402) in an EMR activity report. After filtering patients that met the above criteria, patient ID numbers were placed in a Google random generator and this data was pulled to a master list for review. The same technique and CPT codes were utilized for the post-intervention period which identified 50 total patients including 25 patients each from the first full week (10/18/23-10/22/23) and the fourth full week (10/9/23-10/13/23) of the implementation period.

Basic demographic information including race, gender, and age was collected for each patient both pre- and post-intervention. Additional information collected for patients screened before implementation included if the patient was screened, their response to the EMR question, and if any notation was made by the provider to indicate that an intervention or follow-up was provided. While not commonly included, staff notes with specific information provided by patients regarding their level of alcohol consumption were also collected. During the chart audit, information about alcohol use was found to be populated in the history of present illness (HPI) section titled “additional lifestyle factors.” Though this information was infrequently noted (4/50 charts), it was collected to help evaluate provider practices related to screening patients for alcohol use. For post-intervention audits, collected information included their response to the EMR question, if the patient was screened using AUDIT-C, what screening score they received, and if any notation was made by the provider to indicate that an intervention or referral was provided. Additional comments found within the EMR regarding alcohol consumption, intervention, or follow-up were also collected if noted.

Measures and Analysis

A convergent mixed-methods study design was chosen for this quality improvement project. Implementing the use of SBI with AUDIT-C in a primary care setting to identify alcohol misuse involves complex issues and greater insights are possible by collecting and analyzing concomitant data (Vedel et al., 2019). Quantitative and qualitative data were collected and analyzed separately, then compared, to better understand key factors in implementing a new standardized screening process.

Quantitative Data Analysis

To identify effects of the quality improvement on screening and interventions, descriptive statistics were utilized to compare screening data from pre-and post-intervention. Calculating the frequency for included nominal variables creates a straightforward way to summarize the findings (Kaur et al., 2018). The overall rate of screening for the identified patients, determined by using the number of patients (50) versus the number who were screened, indicates how efficiently the staff conduct screening. By determining the rate of positive screenings, the number screened versus the number of positive screens, the effectiveness of the screening is established. This also provides a clearer picture of how significant the issue of unhealthy alcohol use is among the patient population. Further effectiveness of the SBI project was determined by noting the number of positive screens and the percentage of patients who then received intervention or referral. (See Tables 1-3).

Answers from the pre-and post-surveys of staff and providers were reviewed to provide both qualitative and quantitative data to couple with the measures noted above as a more compelling indication of the overall success of the implementation. Descriptive statistics were utilized to compare quantitative data collected about the knowledge, attitudes, and perceptions of

employees relative to screening for unhealthy alcohol use. Survey topics include perceptions on the effectiveness of each screening method, comfort with screening, rate of screening, and perceived barriers and facilitators of each screening. The inclusion of additional questions in the post-survey specific to SBI and AUDIT-C was designed to garner feedback and determine if its implementation led to negative impacts on staff and their workflow. Finding the absolute frequency of each response and analyzing those percentages allows for quick assessment of the data and its possible effect on project results.

Qualitative Data Analysis

To better understand the perspectives of the providers who participated in the quality improvement project, qualitative data was obtained via open-ended responses to questions included in the provider versions of the Qualtrics surveys. Qualitative analysis was conducted on the responses to each question by the principal investigator and the project advisor, who is an experienced qualitative researcher. Coding was conducted using the methodology of Corban and Strauss (2015). Open and line by line coding was used to name data. Frequent and relevant codes were elevated to level of theme. Some themes were sufficiently thick to have included properties that further describe the themes. Due to the time allotted for the project, no claim of data saturation can be made. (see Tables 8-11)

Results

Chart Audit Data

The pre-and post-intervention data was collected via chart audit. The principal investigator utilized information provided by the Physician Enterprise Assistant Director/Analyst who randomly selected visits for inclusion based on the visit date and CPT code. See Table 1-3

for characteristics of all audited patient visits from pre- and post-intervention, including patient demographics.

Pre-Intervention

Fifty patient visits were randomly selected from the two weeks preceding the initiation of the intervention per the previously discussed criteria. Of those 50 visits, 49 (98.0%) patients were asked about their level of alcohol consumption. The following answers were provided for those 49 screens. 59.2% ($n = 29$) replied none, 30.6% ($n = 15$) replied occasional, 6.1% ($n = 3$) replied moderate, and 4.1% ($n = 2$) replied heavy. There was no documented evidence (populated provider service codes or chart notes) that education, counseling, or referrals were provided for any of the reviewed patients.

Post-Intervention

Following the educational sessions targeting the staff, the practice implemented AUDIT-C to screen patients for unhealthy alcohol use on 9/13/23. Twenty-five patient visits were randomly chosen from the first full week of the intervention (9/18/23-9/22/23) and an additional 25 visits were randomly chosen from the last full week of the intervention (10/9/23-10/13/23), for a total of fifty visits. Of the twenty-five patients from the week one audit, 92.0% ($n = 23$) were screened for unhealthy alcohol use with the AUDIT-C screening tool. Of patients screened with AUDIT-C, 8.7% ($n = 2$) screened positive. The use of the full AUDIT screen was not noted for any patients who screened positive on the AUDIT-C. In the first week, all 25 patients (100%) were provided with education via a pdf file populated to their patient portal, titled Alcohol and Your Health (CDC, 2022). There was no documented evidence (populated provider service codes or chart notes) that a brief intervention was conducted, or referral was provided for any reviewed patient, including those with a positive screen. Of the 25 patients seen during week

four of the intervention, 64.0% ($n = 16$) were screened for unhealthy alcohol use with the AUDIT-C screening tool. Of patients screened with AUDIT-C, 12.5% ($n = 2$) screened positive. The use of the full AUDIT screen was not noted for any patients who screened positive on the AUDIT-C tool. In week four, 21 patients (84.0%) were provided with education via a pdf file populated to their patient portal, titled Alcohol and Your Health (CDC, 2022). There was no documented evidence (populated provider service codes or chart notes) that a brief intervention was conducted, or referral was provided for any reviewed patient, including those with a positive screen.

Quantitative Survey Data

A total of 28 practice employees were sent the pre-intervention survey link, 14 (100.0%) ancillary staff (RN, LPN, MA) and 11 (78.6%) providers (MD, APRN, PA) responded to the provided Qualtrics Likert Scale questions. The follow-up survey was distributed to all employees following the intervention period and responses were received from 11 (78.6%) ancillary staff and 6 (42.9%) providers. Review of the unique identifiers indicates that just 7 ancillary staff (50.0%) and 5 providers (36%) completed both. Tables 4-7 display the quantitative results of Likert Scale questions from the staff divided into ancillary staff and providers.

Pre-Intervention

Regarding knowledge of current alcohol consumption guidelines or what constitutes moderate drinking, four ancillary staff (28.6%) answered that they were not familiar at all, six (42.9%) answered slightly familiar, and four (28.6%) answered moderately familiar. When providers were asked about their knowledge of current alcohol consumption guidelines or what constitutes moderate drinking, two providers (18.2%) answered slightly familiar, five (45.5%) answered moderately familiar, three (27.3%) responded very familiar, and one (9.1%) answered

extremely familiar. Six providers responded (54.5%) slightly familiar, one (9.1%) responded moderately familiar, three (27.3%) responded very familiar, and one (9.1%) responded extremely familiar when asked about their familiarity with recommendations for screening and brief intervention (SBI) for unhealthy alcohol use. Additionally, regarding familiarity with the AUDIT-C tool used to screen for unhealthy alcohol use three providers (27.3%) indicated not at all familiar, five (45.5%) indicated slightly familiar, and three (27.3%) indicated very familiar. When asked how comfortable they were screening for alcohol use two ancillary staff (14.3%) replied somewhat uncomfortable, five (35.7%) replied neither comfortable nor uncomfortable, and seven (50.0%) replied somewhat comfortable. When providers were asked about their comfort with screening patients for unhealthy alcohol use, answers were variable with three providers (27.3%) responding somewhat uncomfortable, two (18.2%) responded neither comfortable nor uncomfortable, three (27.3%) responded somewhat comfortable, and three (27.3%) responded extremely comfortable. Regarding the importance of their role in screening for unhealthy alcohol use one ancillary staff member (7.1%) answered slightly important, four (28.6%) answered moderately important, eight (57.1%) answered very important, and one (7.1%) answered extremely important. With providers' responses to the same question, two providers (18.2%) indicated slightly important, six (54.5%) indicated very important, and three (27.3%) indicated extremely important. When asked how often patients were screened for unhealthy alcohol use, seven ancillary staff (50.0%) indicated sometimes, three (21.4%) indicated about half the time, two (14.3%) indicated most of the time, and three (21.4%) indicated always. Two providers (18.2%) responded sometimes, three (27.3%) responded about half the time, five (45.5%) responded most of the time, and one (9.1%) responded always when asked how frequently patients were screened for unhealthy alcohol use. When asked how effective they

found the current screening practice one ancillary staff (7.1%) answered not effective at all, four (28.6%) answered slightly effective, seven (50.0%) answered moderately effective, one (7.1%) answered very effective, one (7.1%) answered extremely effective. When providers responded to the question regarding effectiveness of screening, two providers (18.2%) answered not effective at all, three (27.3%) answered slightly effective, five (45.5%) answered moderately effective, and one (9.0%) answered extremely effective. (See Tables 4 and 5).

Post-Intervention

When asked how well the educational material provided helped them understand current alcohol consumption guidelines one ancillary staff member (9.1%) replied slightly well, four (36.4%) replied moderately well, five (45.5%) replied very well, and one (9.1%) replied extremely well. Four questions were included that asked providers about how effectively the education materials increased providers' knowledge of alcohol consumption guidelines, SBI, AUDIT-C, and how to conduct a brief intervention. The total of the provider responses ($N = 24$) for those four questions were reviewed and three provider responses (12.5%) indicated that education was moderately effective, thirteen (54.2%) indicated the education was very effective, and eight (33.3%) indicated the education was extremely effective. When ancillary staff were asked how comfortable they were with screening for unhealthy alcohol use with AUDIT-C, four staff (36.4%) answered neither comfortable nor uncomfortable, five (45.5%) answered somewhat comfortable, and two (18.2%) answered extremely comfortable. Providers who were asked about their level of comfort screening with AUDIT-C, had a variable response. Four of the possible answers (extremely uncomfortable, somewhat uncomfortable, neither comfortable nor uncomfortable, and extremely comfortable) received one (16.7%) provider response each while two providers (33.3%) responded somewhat comfortable. Two ancillary staff (18.2%) responded

sometimes, two (18.2%) responded about half the time, four (36.4%) responded most of the time, and three (27.3%) responded always, when asked how often patients were screened for unhealthy alcohol use with AUDIT-C. When providers were asked about frequency of screening patients for unhealthy alcohol use with AUDIT-C during the intervention, two providers (33.3%) answered about half the time, three (50.0%) answered most of the time, and one (16.7%) answered always. One ancillary staff member (9.1%) responded slightly effective, five (45.5%) responded moderately effective, four (36.4%) answered very effective, and one (9.1%) answered extremely effective when asked how effective they felt AUDIT-C was for detecting unhealthy alcohol use. Providers were asked if the use of AUDIT-C for screening improved their ability to recognize and determine unhealthy alcohol use, one provider (16.7%) replied neither agree nor disagree, two providers (33.3%) replied somewhat agree, and three providers (50.0%) replied strongly agree. Providers were asked about their level of confidence in providing a brief intervention for a patient after a positive screen, one provider (16.7%) responded slightly confident, two (33.3%) responded moderately confident, and three (50.0%) responded very confident. Ancillary staff were asked if screening for alcohol use with the AUDIT-C tool increased the time it takes them to complete their job. One ancillary staff (9.1%) somewhat disagreed, eight (72.7%) neither agreed nor disagreed, one (9.1%) somewhat agreed, and one (9.1%) strongly agreed. When providers were asked if using the AUDIT-C screening tool increased the time commitment to screen for unhealthy alcohol use, two (33.3%) neither agreed nor disagreed, two (33.3%) somewhat agreed, and two (33.3%) strongly agreed. Providers were asked if they were likely to continue screening for unhealthy alcohol use using the AUDIT-C screening tool, two providers (33.3%) answered neither likely nor unlikely, one (16.7%) answered somewhat likely, and three (50.0%) answered extremely likely. (See Tables 6 and 7).

Qualitative Survey Data

Qualtrics surveys sent to all 14 providers (MD, APRN, PA) pre- and post-intervention included two open ended questions related to barriers and facilitators of screening for unhealthy alcohol use. A total of 12 (86%) providers participated in the Qualtrics surveys. As previously discussed, 11 providers (79%) completed the pre-intervention version and only 6 (43%) completed the post-intervention version, with just 5 providers (36%) completing both versions. Tables 8-11 display the qualitative data results.

Pre-Intervention

Barriers or Facilitators to Screening in Current Practice. When providers were asked to name what they saw as barriers and facilitators to screening for unhealthy alcohol use in current practice, four themes emerged as barriers, and one theme pertained to facilitators. The theme of *patient-related factors* developed from many providers responding that they felt as if patients were not being truthful or honest during screening. *Provider-related factors* emerged into a theme because provider responses indicated discomfort in asking questions and the number of screenings required. An additional theme, *resources*, developed from provider responses that included comments on “lack of resources” and “lack of quality measures.” The final theme to emerge was *time* with one provider stating that there was a “short time frame for talking with patients.” It was separated from the theme of provider-related factors as the issue of time to complete a patient visit is considered an issue that deserves a separate theme for emphasizing it as a significant barrier to screening. Only one provider indicated a response to consider as a facilitator. The provider specified “screening at every wellness visit and for new patient intake” was elevated into the theme *screening consistently*. (See Table 8).

Specific Parameters for Counseling or Referral in Current Practice. When providers were asked if they had specific parameters that determined when a patient needs counseling or referral for unhealthy alcohol use, answers were divided into four themes. An overwhelming number of responses (n=7) were included in the theme of *alcohol misuse* including two providers who answered, “adverse impact on life”, one provider's response of “multiple drinks per day”, and one provider’s reply of “drinking to treat mental health”. *Provider discretion, patient request, and court-ordered treatment* were the three remaining themes derived directly from individual provider answers. (See Table 9).

Post-Intervention

Barriers or Facilitators to Screening using AUDIT-C. Providers were asked to name what they considered to be barriers and facilitators to screening for unhealthy alcohol use using the AUDIT-C screening tool. Two themes were developed related to barriers while one theme was said to be a facilitator. The theme of *patient-related factors* was developed from one provider's response that “patients were unwilling to participate” and one provider stating that “patients’ response to the tool” was a barrier. One provider indicated that “*time* was a factor” they considered as a barrier, and this was elevated to the level of a theme. Under facilitators, *resources* emerged as the sole theme with one provider answering that “questions are brief” and “adding [the tool] to [the EMR]was very helpful.” (See Table 10).

Specific Parameters for Counseling or Referral with AUDIT-C. Following the intervention, providers were asked if they felt there were specific parameters that determined when a patient needs counseling or referral for unhealthy alcohol use using AUDIT-C. Three themes were identified from the providers' responses. *Alcohol misuse* emerged as a theme from the following provider responses, “a score of four or more,” “a positive screen,” and another

provider stating that “high scores” are a parameter. *Specific AUDIT-C criteria*, a score of four or more, were mentioned by one provider and developed into another theme. The final provider response of “unknown parameters” made the final theme *referral parameters unclear*. (See Table 11).

Discussion

Upon review of this quality improvement initiative, it remains clear that implementing an effective SBI process for unhealthy alcohol use in the primary care setting is faced with a variety of challenges that can be difficult to overcome. The first step in this quality improvement project was to screen patients more effectively for unhealthy alcohol use. Without an effective screening process, the likelihood of proper referrals that help lead to better patient outcomes becomes much more difficult.

The rate of screenings (98.0%) with an invalidated tool pre-intervention was unable to be sustained after initiating the use of the AUDIT-C tool. Despite the rate of patient screenings averaging 78.0% during the project period, the new screening process that included the AUDIT-C tool increased the percentage of positive screenings from 4.1% to 10.3% detected in two weeks. It is important to note, that the positive screenings that were found using AUDIT-C included patients who answered occasionally or none to the previous screening question, signifying that patients who needed additional follow-up related to alcohol use could be potentially missed by utilizing a question that was not validated. Additionally, the chart audit for the post-intervention period included new patient visits where the screening tool was not auto populated which likely affected the use percentage over having solely chosen visits that included the tool automatically but gave a better indication of provider practices related to screening.

By simply screening patients for unhealthy alcohol use, we cannot impact patient outcomes. To realize quality improvement, providers needed to conduct a brief intervention for patients who screened positive with AUDIT-C. Despite being able to identify patients more effectively with the validated screening tool, there is no evidence that patients with a positive screening also received brief intervention or referral to treatment. These results are consistent with prior research (Liu et al., 2019; McKnight et al., 2020) which shows that patients may be asked about their alcohol intake, but they do not receive proper brief interventions at the same rate. Ideally, those patients would have had a full AUDIT conducted to determine if simple brief counseling, continued follow-up, or a referral were warranted for true alcohol dependence or AUD. Prior studies have consistently noted that providers' lack of knowledge about SBI and time concerns are significant barriers to implementation (Bazzi and Saitz, 2019; Rahm et al., 2016; Agle et al., 2016). Efforts made to address these known common barriers before implementing the new process were not enough to fully overcome their effect during the quality improvement project. While clinic providers indicated that the education session was very effective in increasing their knowledge of SBI, it did not translate into providers completing brief interventions during the project period. More focused instruction on what constitutes brief intervention and how to quickly conduct brief intervention may have assisted in more effective implementation of this part of the quality improvement process and should be an emphasis for further improvement efforts.

An additional barrier that reduced the effectiveness of implementation was concern by providers that the new screening questions made patients uncomfortable. While initial discomfort for both provider and patient are expected during the change, repetitive use of the process should bring resolution for both (Rosario et al., 2021). Providers were also concerned that patients were

not fully honest about their use of alcohol, and this was another barrier to screening. One consideration for increasing patient truthfulness is a switch to electronic SBI (eSBI), which has shown promising results in patients answering questions honestly (Johnson et al., 2013). Having patients complete the eSBI before their actual visit may also decrease the time spent by staff on the process, addressing another barrier of concern. Continuing use of SBI with AUDIT-C, with specific modifications to address barriers, may increase the successful utilization of both the screening and the brief intervention.

Balancing measures were another important consideration to gauge while conducting this quality improvement. Survey responses indicate that several clinic providers felt that the SBI process using AUDIT-C increased the time necessary to screen patients for unhealthy alcohol use, which may ultimately limit its utilization, despite ancillary staff responding that it did not necessarily add time to complete their portion. Comfort with the new screening method was comparable to the previous method among ancillary staff, but some providers indicated being less comfortable screening for unhealthy alcohol use with AUDIT-C. It is possible these issues would subside overtime as continued use would lead to more familiarity with the tool but support for continuing the new process among those providers who have these concerns would likely be low. Even with various negative balancing measures noted that may have decreased the use of AUDIT-C, most providers still indicated that they would continue to utilize the screening method and acknowledged that it more effectively identified unhealthy alcohol use.

During this quality improvement project, an effort was made to ensure that each patient was better informed about the harm caused by excessive alcohol consumption regardless of the success or failure of SBI implementation. While 92% of the patients received electronic educational material in their patient portal, it would be difficult to determine its impact on patient

outcomes without further studies that involve patient feedback. Data obtained while conducting chart audits for this project indicated that not all patients utilized the portal, with 16% of the patients having declined its use completely and still more whose portals were inactive. Further studies assessing the access and use of electronic educational materials would provide additional helpful insights.

Limitations

As a quality improvement project, there are some notable limitations to this study. Since the project was completed in one rural clinic, where the majority of patients seen are Caucasian, application to other settings is limited. The small number of ancillary staff and providers included in survey responses puts limits on statistical strength. Low response rates to the post-intervention survey likely included some sample bias thus accuracy of conclusions may be affected. Surveys utilized as part of the project were not validated tools such that reliable results are not ensured. The sample size of patient charts audited compared to average clinic encounters may also have affected the reliability of results. The sample size of fifty patients was chosen to fit within project constraints, but the small percentage of patients included may or may not correctly represent the full patient population or give an accurate account of how frequently AUDIT-C detected unhealthy alcohol use.

Conclusion

As implementation of SBI continues to face challenges, research like this quality improvement project helps add additional insight into what measures can be taken to assist primary care providers in their efforts to prevent harm from unhealthy alcohol use. It is significant that the AUDIT-C tool can quickly be added to the EMR, attached to appropriate visit types, and utilized with relative ease to effectively identify patients who may have unhealthy

alcohol use. While implementation of brief intervention was not as successful for patients with positive screenings, the study design gathered important provider perceptions to better understand what barriers need to be overcome to increase the full use of SBI.

The necessity of increasing provider knowledge of SBI cannot be minimized and appears to be one of the largest barriers to its widespread use in primary care. Encouraging providers to utilize available resources like CEUs provided by The National Institute on Alcohol Abuse and Alcoholism (NIAAA) is a key step to improve provider knowledge of brief intervention and increase confidence to properly utilize it as part of SBI. Medical professional organizations such as the American Academy of Family Physicians and the American Medical Association, who endorse the use of SBI in primary care (CDC, n.d.), should also be part of efforts to advocate for increased and mandatory provider education which could support better implementation.

It is also important to acknowledge the heavy burden of preventive care placed on primary care providers to complete multiple screenings and to find ways to address the barriers they face in meeting those obligations. Currently the USPSTF recommends SBI for all adult patients in the primary care setting. The average age of patients who had a positive screening during this project was 38.5 years old. Per the CDC (2024), 1 in 5 deaths from excessive alcohol use are among adults ages 20 to 49. Considering this data, the initial focus of proper SBI may need to start with a smaller subset of the population as better ways to increase its utilization are determined.

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Figure 1

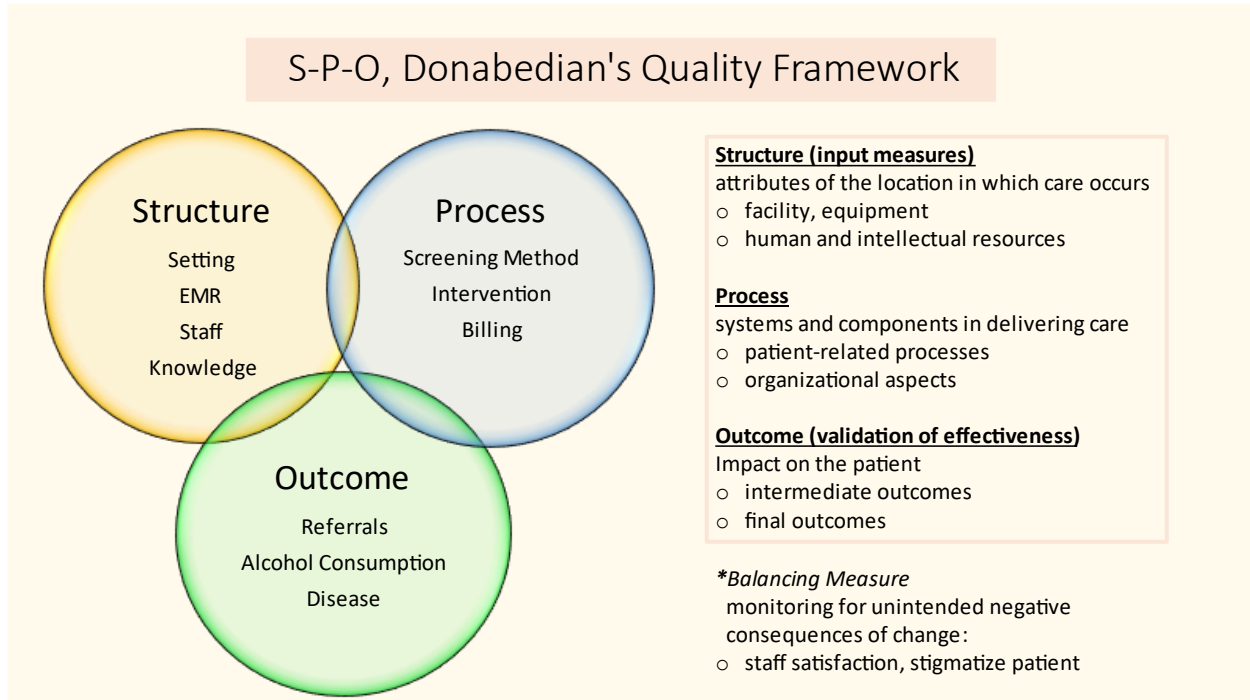


Table 1***Pre-Intervention Data (8/25/23-9/8/23)***

Average Age Patients by sex	Demographics	
	<i>M</i>	<i>SD</i>
Female (<i>n</i> = 30, 60%)	67.4	15.6
Male (<i>n</i> = 20, 40%)	60.5	0.7
	N	%
Type of Visits		
Initial H&P, Age 18-39 YRS	1	2.0
Periodic H&P, Age 18-39 YRS	4	8.0
Periodic H&P, Age 40-64 YRS	16	32.0
IPPE(WELCOME TO MEDICARE)	2	4.0
Medicare Annual Well Visit	27	54.0
Race		
Black or African American	1	2.0
White or White, non-Hispanic	48	96.0
Other	1	2.0
Level of Consumption		
None	29	58.0
Occasional	15	30.0
Moderate	3	6.0
Heavy	2	4.0
Question Not Asked	1	2.0

Table 2***First Week of Intervention (9/18/23-9/22/23)***

Average Age of Patients by Sex	Demographics	
	<i>M</i>	<i>SD</i>
Female (<i>n</i> = 11, 44.0%)	51.5	34.0
Male (<i>n</i> = 14, 56.0%)	58.4	17.0
	<i>N</i>	%
Type of Visits		
Periodic H&P, Age 18-39 YRS	7	28.0
Periodic H&P, Age 40-64 YRS	7	28.0
IPPE(WELCOME TO MEDICARE)	1	4.0
Medicare Annual Well Visit	10	40.0
Race		
Black or African American	2	8.0
White or White, non-Hispanic	22	88.0
Other	1	4.0
Level of Consumption		
None	17	68.0
Occasional	7	28.0
Moderate	0	-
Heavy	0	-
Question Not Asked	1	4.0
Screened with AUDIT-C		
Yes	23	92.0
No	2	8.0
AUDIT-C Scores		
0	11	47.8
1	6	26.0
2	2	8.6
3	3	13.0
4+	1	4.3

Positive Screens

(2/23, 8.7%)^a (2/25, 8%)^b

Female (score = 3 ^c , age = 22)	1	9.0
Male (score = 5 ^c , age = 32)	1	7.1

Note. *N* = 25. Demographic statistics are calculated based on the number of patients sampled. ^a Reflects the number and percentage based on participants who were screened, not total patients. ^b Reflects overall percentage of full patient sample. ^c Denotes patient's AUDIT-C score on screening. Dash means no response for that category.

Table 3***Fourth Week of Intervention (10/9/23-10/13/23)***

Average Age of Patients by Sex	Demographics	
	<i>M</i>	<i>SD</i>
Female (<i>n</i> = 16, 64.0%)	61.4	12.0
Male (<i>n</i> = 9, 36.0%)	61.2	9.2
	<i>N</i>	%
Type of Visits		
Initial H&P, Age 40-64 YRS	3	12.0
Periodic H&P, Age 18-39 YRS	2	8.0
Periodic H&P, Age 40-64 YRS	8	32.0
Medicare Annual Well Visit	12	48.0
Race		
Black or African American	-	-
White or White, non-Hispanic	24	96.0
Other	1	4.0
Level of Consumption		
None	10	40.0
Occasional	12	48.0
Moderate	-	-
Heavy	-	-
Question Not Asked	3	12.0
Screened with AUDIT-C		
Yes	16	64.0
No	9	36.0
AUDIT-C Scores		
0	11	68.8
1	2	12.5
2	1	6.3
3	1	6.3
4+	1	6.3

Positive Screens

(2/16, 12.5%)^a (2/25, 8%)^b

Female (score = 3 ^c , age = 53)	1	9.0
Male (score = 4 ^c , age = 47)	1	7.1

Note. *N* = 25. Demographic statistics are calculated based on the number of patients sampled. ^a Reflects the number and percentage based on participants who were screened, not total patients. ^b Reflects overall percentage base on of full patient sample. ^c Denotes patient's AUDIT-C score on screening. Dash means no response for that category.

Table 4***Quantitative Data- Ancillary Staff Pre-Intervention***

Question	Response	<i>n</i> (%)
How familiar are you with the current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?	Not familiar at all	4, (28.6%)
	Slightly familiar	6, (42.9%)
	Moderately familiar	4, (28.6%)
	Very familiar	-
	Extremely familiar	-
How comfortable are you with screening a patient for unhealthy alcohol use?	Extremely uncomfortable	-
	Somewhat uncomfortable	2 (14.3%)
	Neither comfortable nor uncomfortable	5 (35.7%)
	Somewhat comfortable	7 (50%)
	Extremely comfortable	-
How important do you feel your role is in screening patients for unhealthy alcohol use?	Not at all important	-
	Slightly important	1 (7.1%)
	Moderately important	4 (28.6%)
	Very important	8 (57.1%)
	Extremely important	1 (7.1%)
How often do you feel patients are screened for unhealthy alcohol use during new and yearly wellness exams?	Never	-
	Sometimes	7 (50.0%)
	About half the time	3 (21.4%)
	Most of the time	2 (14.3%)
	Always	3 (21.4%)
How effective do you feel your current screening for unhealthy alcohol use is?	Not effective at all	1 (7.1%)
	Slightly effective	4 (28.6%)
	Moderately effective	7 (50.0%)
	Very effective	1 (7.1%)
	Extremely effective	1 (7.1%)

Note. Dash means no response received.

Table 5***Quantitative Data- Providers Pre-Intervention***

Question	Response	n (%)
How familiar are you with the following:		
current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?	Not familiar at all	-
	Slightly familiar	2 (18.2%)
	Moderately familiar	5 (45.5%)
	Very familiar	3 (27.3%)
	Extremely familiar	1 (9.1%)
Screening and brief intervention (SBI) for unhealthy alcohol use recommendations published by the United State Preventive Services Task Force (USPSTF) for use in primary care	Not familiar at all	-
	Slightly familiar	6 (54.5%)
	Moderately familiar	1 (9.1%)
	Very familiar	3 (27.3%)
	Extremely familiar	1 (9.1%)
the AUDIT-C screening tool	Not familiar at all	3 (27.3%)
	Slightly familiar	5 (45.5%)
	Moderately familiar	-
	Very familiar	3 (27.3%)
	Extremely familiar	-
How comfortable are you with screening a patient for unhealthy alcohol use?	Extremely uncomfortable	-
	Somewhat uncomfortable	3 (27.3%)
	Neither comfortable nor uncomfortable	2 (18.2%)
	Somewhat comfortable	3 (27.3%)
	Extremely comfortable	3 (27.3%)
How important do you feel your role is in screening patients for unhealthy alcohol use?	Not at all important	-
	Slightly important	2 (18.2%)
	Moderately important	-
	Very important	6 (54.5%)
	Extremely important	3 (27.3%)
How often do you feel patients are screened for unhealthy alcohol use during new and yearly wellness exams?	Never	-
	Sometimes	2 (18.2%)
	About half the time	3 (27.3%)
	Most of the time	5 (45.5%)
	Always	1 (9.1%)

How effective do you feel your current screening for unhealthy alcohol use is?	Not effective at all	2 (18.2%)
	Slightly effective	3 (27.3%)
	Moderately effective	5 (45.5%)
	Very effective	-
	Extremely effective	1 (9.1%)

Table 6***Quantitative Data- Ancillary Staff Post-Intervention***

Question	Response	<i>n</i> (%)
How well did the education session help you understand current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?	Not well at all	-
	Slightly well	1 (9.1%)
	Moderately well	4 (36.4%)
	Very well	5 (45.5%)
	Extremely well	1 (9.1%)
How comfortable were you with screening a patient for unhealthy alcohol use using the AUDIT-C tool?	Extremely uncomfortable	-
	Somewhat uncomfortable	-
	Neither comfortable nor uncomfortable	4 (36.4%)
	Somewhat comfortable	5 (45.5%)
	Extremely comfortable	2 (18.2%)
How important do you feel your role is in screening patients for unhealthy alcohol use?	Not at all important	-
	Slightly important	1 (9.1%)
	Moderately important	5 (45.5%)
	Very important	4 (36.4%)
	Extremely important	1 (9.1%)
How often do you feel patients are screened for unhealthy alcohol use during new and yearly wellness exams using the AUDIT-C tool during the project period?	Never	-
	Sometimes	2 (18.2%)
	About half the time	2 (18.2%)
	Most of the time	4 (36.4%)
	Always	3 (27.3%)
How effective do you feel the AUDIT-C is in screening for unhealthy alcohol use?	Not effective at all	-
	Slightly effective	1 (9.1%)
	Moderately effective	5 (45.5%)
	Very effective	4 (36.4%)
	Extremely effective	1 (9.1%)
Please rate how much you agree with the following statement: Screening for alcohol use with the AUDIT-C tool has increased the time it takes me to complete my job	Strongly disagree	-
	Somewhat disagree	1 (9.1%)
	Neither agree nor disagree	8 (72.7%)
	Somewhat agree	1 (9.1%)
	Strongly agree	1 (9.1%)

Note. Dash means no response received.

Table 7***Quantitative Data- Providers Post-Intervention***

Question	Response	n (%)
How effective was the education session for increasing your knowledge about the following topics:		
current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?	Not effective at all	-
	Slightly effective	-
	Moderately effective	1 (16.7%)
	Very effective	3 (50.0%)
	Extremely effective	2 (33.3%)
Screening and brief intervention (SBI) for unhealthy alcohol use recommendations published by the United State Preventive Services Task Force (USPSTF) for use in primary care	Not effective at all	-
	Slightly effective	-
	Moderately effective	-
	Very effective	4 (66.7%)
	Extremely effective	2 (33.3%)
the AUDIT-C screening tool	Not effective at all	-
	Slightly effective	-
	Moderately effective	-
	Very effective	4 (66.7%)
	Extremely effective	2 (33.3%)
how to complete a brief intervention for a patient with a positive screening	Not effective at all	-
	Slightly effective	-
	Moderately effective	2 (33.3%)
	Very effective	2 (33.3%)
	Extremely effective	2 (33.3%)
How comfortable are you with screening a patient for unhealthy alcohol use with the AUDIT-C tool?	Extremely uncomfortable	1 (16.7%)
	Somewhat uncomfortable	1 (16.7%)
	Neither comfortable nor uncomfortable	1 (16.7%)
	Somewhat comfortable	2 (33.3%)
	Extremely comfortable	1 (16.7%)
How confident are you in providing a brief intervention for patients with a positive screening using AUDIT-C?	Not confident at all	-
	Slightly confident	1 (16.7%)
	Moderately confident	2 (33.3%)
	Very confident	3 (50.0%)
	Extremely confident	-

Please rate how much you agree or disagree with the following statements:

use of AUDIT-C for screening improved my ability to recognize and determine unhealthy alcohol use	Strongly disagree	-
	Somewhat disagree	-
	Neither agree nor disagree	1 (16.7%)
	Somewhat agree	2 (33.3%)
	Strongly agree	3 (50.0%)
using the AUDIT-C screening tool increases the time commitment to screen for unhealthy alcohol use	Strongly disagree	-
	Somewhat disagree	-
	Neither agree nor disagree	2 (33.3%)
	Somewhat agree	2 (33.3%)
	Strongly agree	2 (33.3%)
How often do you feel patients were screened for unhealthy alcohol use during new and yearly wellness exams using the AUDIT-C tool during the project period?	Never	-
	Sometimes	-
	About half the time	2 (33.3%)
	Most of the time	3 (50.0%)
	Always	1 (16.7%)
How likely are you to continue screening for unhealthy alcohol use with the AUDIT-C screening tool?	Extremely unlikely	-
	Somewhat unlikely	-
	Neither likely nor unlikely	2 (33.3%)
	Somewhat likely	1 (16.7%)
	Extremely likely	3 (50.0%)

Note. Dash means no response received.

Table 8

Qualitative Data- Barriers and Facilitators to Current Screening Practice

Themes	Properties	Exemplar(s)
Barriers		
Patient-Related Factors	truthfulness of patients (5)	“Patients are not always truthful to their PCP”; “The biggest barrier is getting the patients to be truthful”
Provider Related Factors	Discomfort asking questions, heavy screening burden	
Resources	lack of resources, lack of quality measures	
Time		“very short time frame in which to talk with patients”
Facilitators		
Screening Consistently		“facilitators to screening for unhealthy alcohol use is screening at every wellness and new patient intake”

Table 9***Qualitative Data- Specific Parameters for Counseling or Referral in Current Screening Practice***

Themes	Properties	Exemplar(s)
Alcohol Misuse	overuse, >2 drinks per day/multiple drinks daily, adverse impact on life (2), drinking to treat mental health issues, reported abuse	“many patients in this situation are not open to referral until they have realized it is affecting their daily lives”
Provider discretion		“at this time I would say it is up to the provider’s discretion, there are no absolute parameters in place”
Patient request		“the patient usually requests this help”
Court ordered treatment		

Table 10***Qualitative Data- Barriers and Facilitators to Screening with AUDIT-C***

Themes	Properties	Exemplar(s)
Barriers		
Patient-Related Factors	patient participation, patient response to new tool, truthfulness of patient	“Patients were somewhat taken back by the tool, new for them”; “patient unwillingness to participate”
Time		“usually time factor”
Facilitators		
Resources	tool in EMR, brevity of tool	“the questions are brief”

Table 11***Qualitative Data- Specific Parameters for Counseling or Referral using AUDIT-C for Screening***

Themes	Properties	Exemplar(s)
Alcohol Misuse	score of 4 or more, positive screen, high numbers (score) raise concern	“brief counseling on [un]healthy use when screened positive is fine...”
Specific AUDIT-C criteria		“reference from our educational meeting about the AUDIT-C”
Referral Parameters unclear		“the extent to which the patient needs counseling or referral I did not get a good feel for”

Appendix A

Pre-Survey (MD, PA, APRN)

1. How familiar are you with the following?

a. current alcohol consumption guidelines for men and women (what constitutes moderate drinking)

b. screening and brief intervention (SBI) for unhealthy alcohol use recommendations published by the United States Preventive Services Task Force (USPSTF) for use in the primary care setting

c. the AUDIT-C screening tool

1-Not familiar at all

2-Slightly familiar

3-Moderately familiar

4-Very familiar

5-Extremely familiar

2. How comfortable are you with screening a patient for unhealthy alcohol use?

1-Extremely uncomfortable

2-Somewhat uncomfortable

3-Neither comfortable nor uncomfortable

4-Somewhat comfortable

5-Extremely comfortable

3. How effective do you feel your current screening for unhealthy alcohol use is?

1-Not effective at all

2-Slightly effective

3-Moderately effective

4-Very effective

5-Extremely effective

4. How important do you feel your role is in screening patients for unhealthy alcohol use?

1-Not at all important

2-Slightly important

3-Moderately important

4-Very important

5-Extremely important

5. How often do you feel patients are screened for unhealthy alcohol use during new and yearly wellness exams?

1-Never

2-Sometimes

3-About half the time

4-Most of the time

5-Always

6. What do you see as barriers and facilitators to screening for unhealthy alcohol use in you current practice? Please provide as much detail as possible.

7. Are there specific parameters that determine when a patient needs counseling or referral for unhealthy alcohol use? Please be as specific as possible.

Appendix B**Pre-Survey (RN, LPN, MA)**

1. How familiar are you with the current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?

- 1-Not familiar at all
- 2-Slightly familiar
- 3-Moderately familiar
- 4-Very familiar
- 5-Extremely familiar

2. How comfortable are you with screening a patient for unhealthy alcohol use?

- 1-Extremely uncomfortable
- 2-Somewhat uncomfortable
- 3-Neither comfortable nor uncomfortable
- 4-Somewhat comfortable
- 5-Extremely comfortable

3. How important do you feel your role is in screening patients for unhealthy alcohol use?

- 1-Not at all important
- 2-Slightly important
- 3-Moderately important
- 4-Very important
- 5-Extremely important

4. How often do you feel patients are screened for unhealthy alcohol use during new and yearly wellness exams?

- 1-Never
- 2-Sometimes
- 3-About half the time
- 4-Most of the time
- 5-Always

5. How effective do you feel your current screening for unhealthy alcohol use is?

- 1-Not effective at all
- 2-Slightly effective
- 3-Moderately effective
- 4-Very effective
- 5-Extremely effective

Appendix C

AUDIT-C	
Q1: How often did you have a drink containing alcohol in the past year?	
Answer	Points
Never	0
Monthly or less	1
Two to four times a month	2
Two to three times a week	3
Four or more times a week	4
Q2: How many drinks did you have on a typical day when you were drinking in the past year?	
Answer	Points
None, I do not drink	0
1 or 2	0
3 or 4	1
5 or 6	2
7 to 9	3
10 or more	4
Q3: How often did you have six or more drinks on one occasion in the past year?	
Answer	Points
Never	0
Less than monthly	1
Monthly	2
Weekly	3
Daily or almost daily	4
The AUDIT-C is scored on a scale of 0-12 (scores of 0 reflect no alcohol use). In men, a score of 4 or more is considered positive; in women, a score of 3 or more is considered positive. Generally, the higher the AUDIT-C score, the more likely it is that the patient's drinking is affecting his/her health and safety.	

Appendix D

Post Survey (MD, PA, APRN)

1. How effective was the education session for increasing your knowledge of the following topics?
 - a. current alcohol consumption guidelines for men and women (what constitutes moderate drinking)
 - b. screening and brief intervention (SBI) for unhealthy alcohol use recommendations published by the United States Preventive Services Task Force (USPSTF) for use in the primary care setting
 - c. the AUDIT-C screening tool
 - d. how to complete brief intervention for a patient with a positive screening
 - 1-Very ineffective
 - 2-Ineffective
 - 3-Somewhat effective
 - 4-Effective
 - 5-Very effective

2. How comfortable are you with screening a patient for unhealthy alcohol use with AUDIT-C?
 - 1-Very uncomfortable
 - 2-Uncomfortable
 - 3-Somewhat comfortable
 - 4-Comfortable
 - 5-Very comfortable

3. How confident are you in providing a brief intervention for patients with a positive screening using AUDIT-C?
 - 1-Not confident
 - 2-Slightly confident
 - 3-Somewhat confident
 - 4-Fairly Confident
 - 5-Completely confident

4. Please rate how much you agree or disagree with the following statements
 - a. use of AUDIT-C for screening improved my ability to recognize and determine unhealthy alcohol use.
 - b. using the AUDIT-C screening tool increases the time commitment to screen for unhealthy alcohol use
 - 1-Strongly disagree
 - 2-Disagree
 - 3-Neither agree nor disagree
 - 4-Agree
 - 5-Strongly Agree

5. How often do you feel patients were screened for unhealthy alcohol use during new and yearly wellness exams using the new AUDIT-C tool?

1-Never

2-Sometimes

3-About half the time

4-Most of the time

5-Always

6. How likely are you to continue to screen for unhealthy alcohol use using AUDIT-C moving forward?

1-Very unlikely

2-Unlikely

3-Neutral

4-Likely

5-Very likely

7. What do you see as barriers or facilitators to screening for unhealthy alcohol use with AUDIT-C? Please provide as much detail as possible.

8. Please provide as much detail as possible. Do you feel there are specific parameters that determine when a patient needs counseling or referral for unhealthy alcohol using AUDIT-C?

Appendix E**Post Survey (RN,LPN,MA)**

1. How well did the material from the education session help you understand current alcohol consumption guidelines for men and women (what constitutes moderate drinking)?
 - 1-Not well at all
 - 2-Slightly well
 - 3-Moderately well
 - 4-Very well
 - 5-Extremely well

2. How comfortable are you with screening for unhealthy alcohol use using the new AUDIT-C tool?
 - 1-Very uncomfortable
 - 2-Uncomfortable
 - 3-Somewhat comfortable
 - 4-Comfortable
 - 5-Very comfortable

3. How important do you feel your role is in screening patients for unhealthy alcohol use?
 - 1-Very unimportant
 - 2-Unimportant
 - 3-Neutral
 - 4-Important
 - 5-Very important

4. How often do you feel patients were screened for unhealthy alcohol use during new and yearly wellness exams using the new AUDIT-C tool?
 - 1-Never
 - 2-Sometimes
 - 3-About half the time
 - 4-Most of the time
 - 5-Always

5. How effective do you feel the AUDIT-C tool is in screening for unhealthy alcohol use?
 - 1-Not effective at all
 - 2-Slightly effective
 - 3-Moderately effective
 - 4-Very effective
 - 5-Extremely effective

6. Please rate how much you agree or disagree with the following statement:
Screening for alcohol use with the AUDIT-C tool has increased the time it takes me to complete my job.

1-Strongly disagree

2-Disagree

3-Neither agree nor disagree

4-Agree

5-Strongly Agree