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Improving the Diagnosis of Major Depression in a Primary Care Practice Using the Patient Health-9 Questionnaire

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Abstract

Background: Major depression is a serious health problem that affects both children and adults. It is a leading cause of disability worldwide. Most cases of major depression are treated in primary care settings. Many cases of major depression presenting in primary care are missed. Many PCPs do not routinely use screening tools. The aim of this project is to improve the diagnosis of major depression in adults in a primary care practice through routine use of the Patient Health Questionnaire-9 (PHQ-9) during initial encounter with patients and during follow-up visit for patients who are receiving treatment for depression to assess their response to treatment.

Method: Chart review of patients 30 days prior to intervention was conducted to get a baseline on the utilization rate of PHQ-9 by the providers. Literature review conducted to obtain the best available evidence in support of screening for depression in primary care. The Plan-do-Study-Act model was used for this quality improvement project. Post-intervention chart review was conducted following 30 days of implementation to evaluate the outcome measures.

Intervention: Pretest survey was done to assess knowledge of providers on depression tool. Both providers indicated being familiar with the PHQ-9. Education focused on screening and diagnosing major education was conducted. Post-test survey was done after 30 days of implementation.

Results: Pre-test survey showed that the providers reported using PHQ-9 during initial encounter only for patients reporting of symptoms of depression. Previous patient encounters did not include the use of the PHQ-9. Following intervention, 100% utilization rate was achieved for both new patients and follow-up cases for patients already receiving treatment for depression.

Conclusion: The diagnosis of major depression can be improved in primary care settings through routine use of a validated depression tool like PHQ-9 by primary care providers.

Keywords: major depression, diagnosing major depression, patient health questionnaire, PHQ-9, primary care

Table of Contents

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Introduction

Problem description

Major depression is a serious health crisis affecting millions of people globally. The American Psychiatric Association (2013) describes major depression as:

> A disorder marked by either a sad mood most of the day or nearly every day or loss of pleasure or motivation in addition to any three or more of the following symptoms during the same 2-week period: changes in appetite, significant weight gain or loss unrelated to dieting, tiredness, slowed thought or physical activities, difficulty in making decisions, difficulty focusing, feelings of worthlessness, hopelessness, worthlessness or inappropriate guilt, and preoccupation with thoughts of death or suicide (p. 160).

Major depression affects both children and adults. More than 300 million people are affected globally with more women affected than men (WHO, 2017). In 2017, about 17.3 million adults and 2.3 million adolescents experienced one episode of major depression in the United States (NIMH, 2019). The lifetime prevalence of major depression is worrisome to the health authority. In the U.S. the prevalence is estimated at 20.6% or 1 out of 5 adults (Hasin et al., 2018). Major depression is associated with a myriad of problems. It is a leading cause of disability worldwide and majority of patients suffering from it are treated by primary care practitioners (PCPs) (Björkelund et al, 2018; Searle et al., 2019). It often occurs with most chronic disease conditions such as diabetes, heart diseases, chronic musculoskeletal conditions involving pain, and cancers. Depression is also seen with some mental disorders such as bipolar disorder, schizoaffective disorder, and dysthymia. Suicidal ideation and subsequent suicide have been linked to depression with the risk being more than 20 times higher compared to the general population (Lépine & Briley, 2011; Bachmann, 2018). This makes a case for the assessment of depression during clinical encounters with patients.

Primary care practitioners are usually the first point of contact when an individual requires care for a health-related problem. The condition may affect physical health, mental health, and psychological wellbeing. About 60% of mental health services are provided by primary care practitioners (Frank et al., 2003). Therefore, PCPs are in a unique position to assess and provide care to individuals presenting with depression. It is estimated that about 62% of antidepressants are prescribed by PCPs (Mark et al., 2009).

A common issue with managing major depression in general practice is its identification. Most PCPs do not routinely assess for depression during clinical encounters with clients except when they complain of depression or once a year during clients' annual physical assessment. Many cases of major depression are either missed or misdiagnosed as many patients may not report classic symptoms of depression, especially sadness of mood (Gautam et al., 2017). Such patients end up with a wrong diagnosis which may lead to needless treatment and waste of resources. Many PCPs do not use depression screening tools despite their availability but rely more on their clinical judgment (Shaw et al., 2013).

Available Knowledge

Major depression is the second most common mental health disorder and a leading cause of disability. It is marked by a persistent sad mood and a diminished interest in activities that one normally enjoys, accompanied by an inability to carry out daily activities, for at least two weeks (WHO, 2017). Accurate diagnosis of major depression is pivotal to its management especially as most patients with major depression may not present with the classical symptoms of depression. Many patients in primary care have chronic diseases. The link between chronic diseases and depression has long been established. Most of these patients focus on their physical health not realizing the deleterious effect of a coexisting mental illness, especially depression. The identification rate of major depression in general practice is less than 50% (Kamphuis et al., 2012; Vermani et al., 2011; Pérez-Stable et al., 1990). In a study conducted in New Zealand, Carey et al. (2014) found when compared to PHQ-9, the sensitivity and specificity of general practitioners' unassisted detection of depression was 51% and 87% respectively with a positive predictive value (PPV) of 47% and negative predictive value (NPV) of 88%. In addition to many missed

cases of depression, there is also the danger of over diagnosis with consequent needless treatment and waste of resources (Mojtabai, 2013).

Despite the availability of many screening tools for screening for depression, many PCPs do not use them routinely which results to many missed cases of major depression (Braunschneider et al., 2020). Some of these tools are freely available and some have been modified for use in different age populations. Their psychometric properties have been validated. Some are simple and can be self-administered while some are complex and take a considerable amount of time to complete. The most used tools include the Patient Health Questionnaire - 2 (PHQ-2), Patient Health Questionnaire-9 (PHQ-9), Beck Depression Inventory (BDI), Quick Inventory of Depressive Symptomatology Self-Rated (QIDS-SR), Zung Depression Scale, and the Center for Epidemiologic Studies Depression Rating Scale (CES-D). These tools are for screening purposes only. Major depression is diagnosed based on the Diagnostic Statistical Manual for Mental Disorders 5th Edition (DSM-5) criteria for major depression.

The PHQ-9 is an appropriate diagnostic tool for depression in primary care (Appendix A). This tool was developed by Dr. R. L. Spitzer and colleagues in 1999. Its psychometric properties have been validated in different contexts by numerous studies. It has an internal consistency of between 0.86 and 0.89 and sensitivity and specificity of 88% (Kroenke et al., 2001). This tool is simple and easy to use. It is freely available. It takes less than three minutes to complete and can be self-administered. It has been translated into many languages and adapted to different age groups. The PHQ-9 contains nine questions with each item rated from 0-3 points for a total score range of 0-27 with a cut off score for depression as 10 (Appendix B). The items on this tool mirror the 9 criteria for diagnosing depression in the DSM-IV. PHQ-9 is chosen over PHQ-2 because it has better psychometric properties. Furthermore, Item 9 on the PHQ-9 asks a question that can uncover a person at considerable risk of suicide. In addition to being a diagnostic tool, it is useful in monitoring response to treatment.

An exhaustive literature search was conducted using PubMed database for English language for the highest level of evidence including clinical guidelines published between 2009 and 2020. Inclusion criteria included are adults, major depression, primary care, outpatient practices, primary care

practitioners, internists, family nurse practitioners, and general practitioners. Excluded terms included are children, adolescents, bipolar disorder, schizoaffective disorder, substance-induced depression, and depression from other causes. The search terms used were screening for major depression, diagnosing major depression, primary care, guidelines, benefits, and harms. Initial search produced 6 systematic review articles out of which 3 met the inclusion criteria and were retained for this review and focused on the need for the improvement of the diagnosis of depression in primary care. In addition, 3 relevant articles were identified through reference review.

The United States Preventive Services Task Force (USPSTF) (2016) recommends that every adult including pregnant woman and postpartum women be screened for major depression. This is a grade B recommendation that was made based on the best available evidence. The USPSTF contends that there is a high certainty that the benefits of screening outweigh the harm. The benefits are rated as moderate to substantial. In order to obtain the benefit from screening USPSTF recommends that there must be adequate provision for effective management of identified cases because screening alone does not improve outcome. Studies have shown this to be true. The benefits of screening adults in primary care are documented in the literature. One such benefit is that it may identify cases of depression in individuals presenting with somatic symptoms who may not understand that they are actually suffering from depression (O'Connor, 2016). This is important because without screening, such people will be missed and needed treatment that could reduce the burden of depression might not be initiated resulting to needless suffering and low productivity. Depression screening combined with effective management resulted in a 9% reduction in the number of patients diagnosed with persistent depression when compared to the usual care (Smithson and Pignone, 2017). This becomes important considering that most cases of major depression are treated in primary care.

The relationship between suicide and depression has been widely studied and referenced in articles. Realizing the increased risk of suicide in patients with depression, it becomes important screening adults in primary care should be recommended. Screening may uncover patients who are potential suicide risk (O'Connor et al., 2016). Item number 9 of the PHQ-9 asks a question that may give

a clue that a patient might be at a higher risk of suicide. Routine screening becomes important considering that suicide is the tenth leading cause of death in the US with about 48,000 completed suicides in 2018 (CDC, 2021). Uncovering persons with suicidal ideation through screening with effective management protocol has been shown to reduce the rate of completed suicides. Okolie et al. (2017) found that effective intervention in depressed persons with suicidal ideation significantly reduced the rates of suicidal ideation at 6 and 12 months compared to usual care.

There is a controversy regarding the safety of screening for depression in primary care. Opponents of mass screening are of the opinion that it will cause harm to the patients. The individuals may be falsely identified, stigmatized, and subsequently exposed to unnecessary treatment with inherent side effects (Thombs et al., 2017). However, various studies have indicated that there is little to no harm involved in mass screening (USPSTF, 2016 and Smithson & Pignone, 2017).

While USPSTF recommends mass screening of adults for depression in primary care, the UK National Institutes for Health and Clinical Excellence (NICE) and the Canadian Task Force on Preventive Health Care (CTFPHC) offer different recommendations. NICE recommends screening for only individuals who are at elevated risk for depression such as those with past history of depression or those with chronic health conditions such as diabetes, arthritis, and cancer. CTFPHC recommends no routine screening for adults in primary care and advises providers to be at an alert for patients who will be presenting for symptoms suggestive of depression (Joffres et al., 2013). The reason being that there is no evidence of direct benefit to routine screening.

Rationale

Major depression is a serious mental illness resulting in severe disability. Being cognizant of this, the USPSTF (2016), recommends screening every adult including pregnant and postpartum women for depression. The taskforce acknowledges the need for accurate diagnosis and plan for effective treatment and appropriate follow-up. Many patients with major depression receive treatment from primary care providers. Most of these providers lack formal training in psychiatry after graduating from medical school. They acquire some knowledge of psychiatry mostly by individual reading. As the providers

already have some knowledge in managing a wide array of health conditions including depression, the Constructivist Learning theory is appropriate as a theoretical underpinning in developing the intervention that will be used in this project. This theory is based on the premise that people learn to build on what they already know. In order words, people strive to improve on the knowledge they already possess.

Specific Aims

The focus of this pilot QI project is to educate the providers on the use of PHQ-9 depression screening tool with the aim of improving the diagnosis of major depression in a primary care setting. The specific goals are:

The providers will increase their utilization rate of PHQ-9 depression tool by 50% in 30 days during encounter with new patients.

The providers will increase their use of PHQ-9 by 50% in 30 days during follow-up appointments for patients who are receiving treatment for major depression to assess their response to treatment.

Methods

Context

The site for this QI project is an adult outpatient practice located in New Jersey. This practice has a medical director who is a board-certified hematologist, oncologist, and internist as well as a part-time family nurse practitioner and ancillary staff. The practice cares for both oncology patients and general medical issues. On average, the practice cares for approximately 250 patients monthly. Funding includes government insurance (Medicare and Medicaid), private insurance, and self-pay. An electronic medical record is used for daily operation. This practice is a good site for this project considering the patient population that it serves. In addition to caring for patients with general medical conditions, the director also manages patients with hematological issues and cancer. It is known that depression often follows potentially terminal health conditions such as a cancer diagnosis (Sellick and Crooks, 1999). Currently, the protocol is to assesses for depression only when a patient presents with the classic symptoms of depression and during annual physical assessment.

Cost-Benefit analysis

Major depression affects social, educational, and occupational functioning of the affected individual. The economic burden of major depression has been a major focus of health economists. An annual revenue loss of about $36.6 billion is attributed to low productivity and absenteeism from work related to major depression in the US (Lépine & Briley, 2011). This ultimately results in a decrease in low productivity and quality of life affecting not only the individuals but their families and society as a whole. In terms of healthcare cost, the annual US estimate is over $210 billion (Maurer et al., 2018). With this astronomical financial tag on depression as noted, improved screening, early identification, and adequate treatment could go a long way in reducing the burden of depression. Early identification is particularly important as fewer resources would be required and a better outcome achieved than treating depression as a chronic condition. In a study done in Saudi Arabia, Al-Qadhi et al., (2014) found that up to 500 SAR ($133) could be saved by screening each adult once per year. Similar benefits have been noted in other countries. Therefore, screening for depression in primary care is important considering that most patients with depression are treated by general practitioners.

The cost of implementing this project in this practice was calculated based on the hourly rate of the providers multiplied by the number of assessment tools completed by each provider. In addition, the time spent during the educational process was also translated to monetary value based on their hourly rate. There was no financial cost for the involvement of the project leader.

Intervention

The Plan-Do-Study-Act (PDSA) model of quality improvement was used for this quality improvement project (Appendix C). This is an improvement model that has been used in many fields including healthcare arena. It is used to improve a process that is considered inefficient through testing. In the “Plan” stage, the team was identified, the objectives were clearly defined, and the type of data to be collected decided. The “Do” stage involved implementation of the plan and data collection. In the “Study” stage, data collected was analyzed and inference made. In the “Act” stage, there was a reflection on the outcome. A desired outcome was obtained and communicated to the providers who are the main

stakeholders. The medical director indicated her intention to utilize the tool during initial encounters with all new clients and during follow-up visits by those receiving treatment for depression. The process would have been modified and repeated if the desired outcome were not met. As an improvement model, this model minimizes or eliminates waste in an organizational process. It brings about change that is sustainable (National Institute for Children's Health Quality, (2021).

Education was the key component of the intervention. Prior to the intervention, a date was agreed upon when both providers will be available. The focus of this intervention was on the use of PHQ-9 for identifying depression, rating its severity, and monitoring response to treatment. A pre-test and post-test survey (Appendix D) was deployed to the providers.

A pre-test survey was conducted to ascertain providers' current knowledge of the screening tool. The providers received education on the proper use of PHQ-9. The educational premise is to build on their current knowledge of assessing and managing depression. The focus of which would be on using PHQ-9 questionnaire as a screening tool for identifying depression and rating its severity during initial encounter with patients.

The providers were also educated on the importance of administering PHQ-9 to patients who were being treated for depression during follow-up visits. The purpose here was to monitor the patients' response to treatment. A post-test survey was conducted at the end of the implementation period to ascertain the impact of the educational intervention on the providers' knowledge and utilization of the tool.

Specifics of the team involved in screening and diagnosing major depression

The project leader (DNP student) was responsible for organizing and leading the team. He planned the project, implemented the intervention, collected, and performed data analysis, and disseminated results to the stake holders. The medical director who is also a provider in the practice was required to administer the assessment tool during initial encounters with patients and during follow-up visits to monitor response to treatment by those who were being treated for depression. The nurse

practitioner in the practice was also expected to administer the tool to all new patients and those already receiving treatment for depression to assess their response to treatment.

Study of the Intervention(s)

The study of the educational intervention was evaluated at the end of the implementation. The project leader conducted a chart review of all new patients and those already being managed for depression during the intervention period to ascertain the degree of usage of the assessment tool by each provider. The data was compared to data obtained from the chart review of patients seen 30 days before intervention. Also, a post-test survey was conducted, and the result was compared with pre-test survey result.

Measures

The outcome of interest in this project was an increase in the utilization rate of PHQ-9 by the providers in the practice. This was measured by conducting a chart review. A chart review of the patients seen in the practice prior to and during the intervention was conducted and analyzed. Chart review is "A process aimed at obtaining retrospective data to answer clinical queries" (Sarkar & Seshadri, 2014). Charts are readily available. The rate of utilization of PHQ-9 by the providers was reviewed as a goal of this project is to improve the diagnosis of major depression in the practice using PHQ-9. How frequently each provider used the tool during encounter with new patients and during follow-up visits to assess response to treatment was evaluated.

In terms of contextual factors that impacted this project, the project leader kept records on the process and the outcomes were monitored for the time the providers will be engaged in the project. In addition, the project leader ensured that the EMR used in the facility has PHQ-9 assessment tool incorporated in it. A new provider joining the practice during the implementation phase of the project was excluded. A crucial element is the COVID-19 pandemic. This impacted the providers and patients resulting in a low clinic attendance. The project leader assessed for completeness and accuracy of data by conducting multiple review of the data obtained from the intervention. The records of all new patients and those being managed for depression were reviewed thoroughly.

Analysis

Quantitative method of analysis was used to analyze data obtained from chart review in order to draw inferences. The frequency of use PHQ-9 and the number of cases of depression identified during the intervention period was compared to the records prior to intervention. Also, the result of the posttest was analyzed and compared to that of the pretest. The result was displayed in a tabular form to provide a visual summary of the findings based on each provider's performance.

Ethical Considerations

The ethical implications of the project were discussed with the medical director. Issues regarding HIPAA (Health Insurance Portability and Accountability) rules were at the center stage. There was an understanding that this project would be carried out without the student making any contact with the patients. No patient's personal identifier was used in this project. There was no potential conflict of interest involved in this project. There was no external financial support. The proposal was forwarded to the Department of Nursing Clinical Review Committee for reviewing and approval.

Results:

a. Initial steps of the intervention(s)

The project leader conducted a pre-test to get a baseline of the providers' knowledge in assessing depression using a depression tool (see appendix D). This was followed by a 45-minute focus education during which a PHQ-9 was presented. Each item on the tool was explained including the scoring criteria. The providers were required to use the tool for their new patients. They were also to administer the tool during follow-up visits by patients already being treated for depression to assess their response to treatment. A post-test was conducted 30 days after implementation using the same questionnaire for pre-test. This marked the end of the first PDSA cycle.

The pretest result showed that both providers identified PHQ-9 as a familiar depression tool. Both providers endorsed using it during initial encounters with patients who presented symptoms suggestive of depression. In terms of confidence in assessing patients for depression (question # 2), the NP expressed being somewhat confident.

Table 1:

Pre-test Survey Results

Questions	Response MD)	Response (NP)
1. Are you familiar with any depression screening tool? Yes/No If yes, which one are you most familiar with?	Yes PHQ-9	Yes PHQ-9
2. How confident are you with assessing patients for depression?	Confident	Somewhat confident
3. How frequently do you use the tool during initial encounter with patients who complain of symptoms suggestive of depression?	Frequently	Frequently
4. How frequently do you use it during initial encounter with patients who do not complain of symptoms suggestive of depression?	Never	Never
5. How frequently do you use it during follow-up visits for patients receiving treatment for depression?	Never	Never
6. How confident/comfortable are you with using the depression tool?	Confident	Confident
7. How useful do you find the depression tool?	Useful	Useful

Table 2:

Post-test Survey Results

Questions	Response (MD)	Response (NP)
1. Are you familiar with any depression screening tool? Yes/No If yes, which one are you most familiar with?	Yes PHQ-9	Yes PHQ-9

2. How confident are you with assessing patients for depression?	Confident	Confident
3. How frequently do you use the tool during initial encounter with patients who complain of symptoms suggestive of depression?	Frequently	Frequently
4. How frequently do you use it during initial encounter with patients who do not complain of symptoms suggestive of depression?	Frequently	Frequently
5. How frequently do you use it during follow-up visits for patients receiving treatment for depression?	Frequently	Frequently
6. How confident/comfortable are you with using the depression tool?	Confident	Confident
7. How useful do you find the depression tool?	Useful	Useful

Chart review

The project leader reviewed 219 records of patients who were seen 30 days prior to intervention. A total of 13 patients were excluded because they were oncology patients. Of the remaining 206, 11 presented for initial visit and 195 were for follow-up and medication management. The medical director (MD) attended to all the new patients and 143 (73%) of the follow-up cases. The part-time Nurse Practitioner (NP) attended to 52 (26%). Of the 11 new patients, one reported symptoms of depression. The MD utilized the PHQ-9 and diagnosed this patient with major depression. Four of the follow-up cases were receiving medication management for depression. Of these 4, each provider saw 2. Neither used the PHQ-9 to assess response to treatment. See table 3.

Table 3:

Chart review 30-days pre-intervention

	Number of new patients	PHQ-9 used	Follow-up cases for depression	PHQ-9 used
MD	11	1	2	0
FNP	0	0	2	0
Total	11	1 (9%)	4	0 (0%)

Post intervention Chart review: A total of 224 patients were seen out of which 8 were oncology patients and were excluded. Of the remaining 216, 9 were new patients. The MD saw all the new patients and 146 (71%) of the follow-ups. PHQ-9 was administered to all the new patients. Two of the new patients met the criteria for depression. One of them scored 10 points and the other scored 11 points on the PHQ-9 tool and were diagnosed with depression. The NP attended to 61 (29%) of the follow-up cases. There were 5 follow-up cases receiving treatment for depression. The MD attended to 3 while the NP saw 2 of them. Both providers used PHQ-9 to assess their responses to treatment. See table 4.

Table 4:

Chart Review 30-days post-intervention

	New patients	PHQ-9 used	Follow-up cases for depression	PHQ-9 used
MD	9	9 (100%)	3	3
NP	0	0	2	2
Total	9	9 (100%)	5	5 (100%)

The providers met the outcome measures. For the new patients, the utilization rate of the depression tool was 9% and 0% for patients receiving treatment for depression respectively prior to intervention. These scores went up to 100 % for the two categories of patients following intervention. The NP reported an improved confidence level in assessing patients for depression. The success of this intervention is based on the prior knowledge of the providers on the use of the tool which the educational process enhanced. Also, a discussion with them on the negative impact of depression supposedly heightened their interest in improving the diagnosis of depression in the practice.

The theoretical cost associated with this project is based on the hourly rate of each of the providers. It takes approximately 3 minutes to complete and interpret a PHQ-9 questionnaire. The MD completed a total of 12 PHQ-9 questionnaires resulting in 36 minutes of her time. At an hourly rate of $200, this amounted to $120. The education process was 45 minutes resulting in $150 cost to the practice. The NP administered 2 PHQ-9 questionnaires. At an hourly rate of $90, $9 was the cost to the practice.

The cost of the education process related to the NP was $67.50. Hence the total cost of implementing this project to the practice was $346.50. There was no cost associated with the project leader. The practice can recoup this money by billing the patients' health insurance carriers for the screening because using screening tools is reimbursable.

There was no missing data in this project.

Summary

The intervention is a success as the PHQ-9. The utilization rate of PHQ-9 for new patients increased from 9% 30 days prior to intervention to 100% following intervention. Two of the new patients were identified who met the criteria for major depression despite not complaining of the classical symptoms of depression. These patients were not clinically sick. As a result, they were not started on any treatment. However, a follow up appointment was scheduled during which a PHQ-9 would be used to monitor severity of their symptoms. There is a risk that the condition may progress. These 2 cases would have been missed had the provider failed to use the PHQ-9. This agrees with the literature. About 50% of cases of depression are missed in primary care (Kamphuis et al., 2012; Vermani et al., 2011). It can be rightly said that the use of PHQ-9 improved the clinical acumen of the provider in making the diagnosis.

In addition, both providers achieved a 100% utilization rate of the tool compared to 0% 30 days prior to intervention for patients being treated for depression. One of the intended uses of the PHQ_9 is to monitor response to treatment by those that are being treated for depression. It is used in clinical practice to evaluate changes in the severity of a patient's symptoms. This is relevant as the responses provided by the patients are subjective.

Strengths:

PHQ-9 is a tool that has been validated as a screening /diagnostic tool for depression in different settings. It has very good psychometric properties. Also, this QI project is the first of its kind in this practice. Thirdly, the highest available level of evidence was used in the literature review.

Interpretation

In this QI project, there is a direct association between the intervention and outcomes of interest. The providers were aware of the tool prior to intervention. Both reported using it frequently during initial encounter with patients who complained of symptoms of depression but not for those who did not report any depression symptoms. They also reported that they were not using it to monitor response to treatment. However, after the intervention through focus education, the providers utilized the tool as they were thought. The PHQ-9 has been used in many settings for screening and case finding. It is also used for diagnostic purposes because the items on the screen reflect the diagnostic criteria for major depression in the DSM-IV which have remained the same in current edition (DSM-5). This result agrees with the literature. At the cut off score of ≥10, the PHQ-9 has acceptable diagnostic accuracy for major depression (Morfiarty et al., 2015). The lack of proper utilization of the PHQ-9 as a screening/diagnostic tool for depression and for monitoring response to treatment is not peculiar to the providers in this practice. Primary care providers do not routinely use depression screening tools (Shaw et al., 2013). The MD would have failed to identify the cases of depression had it not been that the tool was used for all the new patients. This finding has an impact on the practice as the MD decided to incorporate assessing all new patients for depression using the PHQ-9. This decision becomes more important at this time considering the increasing number of people reporting symptoms of depression due to the COVID-19 pandemic.
The result of this QI project was in line with the expectation of the project leader. The providers' awareness of the tool prior to intervention coupled with their interest in the project contributed to the outcome.

Another contextual element that facilitated the implementation of this project is the use of an EMR that has PHQ-9 embedded. The incorporation of a patient portal makes it easy to send documents to patients electronically. PHQ-9 and other forms can be sent this was way. This was utilized in some cases for patients who had virtual encounters (telehealth). The development of patient portals makes it easy for patients to complete and sign documents including screening tools.
In carrying out this project, time that would have been used to provide services to the patients in the practice was diverted to this project. The attributable cost of the project to the practice was $254.

Limitations:

This QI project had several limitations. There were only two participants involved in the project. All the new patients were seen by the MD. It was not possible to determine what the NP who is a part-time staff would have done with the new patients.

Another limitation was the time frame. An implementation period of 30 days was not enough time. A longer period would have meant more new patients and follow-up cases. The sustainability of administering the tool by the providers would have been tested.

COVID-19 impact was another limitation. With social-distancing and many offices not conducting in-person businesses, clinic attendance has been low. Telehealth services became the norm. However, there are many people who do not know how to use technology to assess healthcare services.

Conclusion

The results of this QI project agree with the literature. Many PCPs do not routinely assess patients for depression. Despite the availability of numerous depression scales, most providers do not use them as required. This project is useful because many people with depression do not complain of the classical symptoms when they present for treatment. Hence, a diagnosis of depression may be missed if the provider fails to administer a depression tool. Two patients were identified as having depression despite not complaining of the characteristic symptoms of depression. The medical director declares her intention of incorporating the tool during encounter with new patients and during follow-up for patients being treated for depression. This project can be replicated in another practice. This will be something worthwhile where there are more providers and there is no limitation on what the providers are allowed to do. Adoption of a routine use of PHQ-9 during initial interaction with clients may help uncover cases of depression especially if the patient does not verbalize symptoms of depression. PHQ-9 is equally useful as a monitoring tool to assess the response to treatment by patients who are being treated for depression. The project leader would like to repeat this project in other settings like an adolescent practice setting, long-term care facility, or a facility with more providers.

Funding: No external source of funding was involved in this project.

Phase 2

Method

Context

This phase of the project will be carried out in a primary care setting located in New York. In contrast to phase one, this site has multiple providers that include four primary care doctors and three doctorate-prepared nurse practitioners. The practice sees between 400-600 patients weekly providing medical care to adult population (18 years and above) from different ethnic and cultural backgrounds. It accepts government insurance (Medicare and Medicaid), private insurance, and self-pay. An electronic medical record (Practice Studio) is used for daily operation.

Intervention

In this cycle, a pre-test survey and educational intervention were delivered to the providers electronically via UNH Qualtrics. Post-intervention survey was distributed electronically 30 days after intervention. Chart review was not conducted in this phase. Pre-test and post-test results were analyzed. The effectiveness of the educational intervention was evaluated based on the change in the providers' knowledge and utilization of the depression tool.

Results

Table 1: Pre-Test Result

	Responses	Provider 1	Provider 2	Provider 3	Provider 4	Provider 5	Provider 6
1. Are you familiar with any depression screening tool?	Yes No	Yes	Yes	Yes	Yes	No	Yes
2. If yes to question 1, which tool are you familiar with?		PHQ-9	BDI	PHQ-9	BDI	None	PHQ-9
3. Are you familiar with Patient Health	Yes No	Yes	Yes	Yes	Yes	No	Yes

Questionnaire -9?							
4. If yes to question 3, do you use it? If not why?				Yes			Yes
5. How confident do you feel diagnosing a patient with depression?	Not confident Somewhat confident Confident	Somewhat confident	Somewhat confident	Confident	Confident	Somewhat confident	Confident
6. How frequently do you use the tool during initial encounter with patients who complain of symptoms suggestive of depression?	Never Not frequently Frequently	Not frequently	Not frequently	Frequently	Not frequently	Not frequently	Not frequently
7. How frequently do you use the tool during initial encounter with patients who do not complain of symptoms suggestive of depression?	Never Not frequently Frequently	Never	Never	Frequently	Not frequently	Not frequently	Never
8. How frequently do you use it during follow-up visits for patients receiving treatment for depression?	Never Not frequently Frequently	Not frequently	Not frequently	Frequently	Not frequently	Not frequently	Not frequently
9. How confident are you with	Not confident	Somewhat confident	Somewhat confident	Confident	Somewhat confident	Somewhat confident	Somewhat confident

using the depression tool?	Somewhat confident Confident						
10. How useful do you find the depression tool?	Not useful Somewhat useful Useful	Somewhat useful	Useful	Useful	Somewhat useful	Somewhat useful	Useful

Out of the 6 providers who responded to the pre-test survey, 5 (83%) are familiar with PHQ-9 depression screening tool while one is not familiar with any screening tool. In response to confidence level in diagnosing depression, 50% of the providers reported being confident while the other half is somewhat confident. Five providers reported that they do not frequently use a screening tool during initial encounter with patients who complain of symptoms suggestive of depression. Three (50%) reported that they never use the tool during initial encounter with patients who do not complain of symptoms that are suggestive of depression. Two reported using the tool but not frequently for such patients. Only one (17%) provider reported using a PHQ-9 during initial encounter with such patients and others without symptoms of depression. This same provider also reported that he uses it to assess response to treatment during follow-up visits while the others reported infrequent use during follow-up visits. This provider is also the only one that reported being confident in using PHQ-9. Regarding the usefulness of the tool, 50% reported that they found it useful while the other 50% described it as somewhat useful.

Table 2: 30-days post-Intervention

	Responses	Provider 1	Provider 2	Provider 4	Provider 5	Provider 6
1. Are you familiar with any depression screening tool?	Yes No	Yes	Yes	Yes	Yes	Yes
2. If yes to question 1, which tool are you familiar with?		PHQ-9	PHQ-9	PHQ-9	GAD	PHQ-9
3. Are you familiar with Patient Health Questionnaire -9?	Yes No	Yes	Yes	Yes	Yes	Yes
4. If yes to question 3, do you use it? If not, why?		Yes	Yes	Yes	Not useful in my work	Yes

5. How confident do you feel diagnosing a patient with depression?	Not confident Somewhat confident Confident	Confident	Confident	Confident	Somewhat confident	Somewhat confident
6. How frequently do you use the tool during initial encounter with patients who complain of symptoms suggestive of depression?	Never Not frequently Frequently	Frequently	Frequently	Not frequently	Not frequently	Frequently
7. How frequently do you use it during initial encounter with patients who do not complain of symptoms suggestive of depression?	Never Not frequently Frequently	Not frequently	Not frequently	Never	Never	Not frequently
8. How frequently do you use it during follow-up visits for patients receiving treatment for depression?	Never Not frequently Frequently	Frequently	Frequently	Not frequently	Never	Not frequently
9. How confident are you with using the depression tool?	Not confident Somewhat confident Confident	Confident	Confident	Somewhat confident	Somewhat confident	Somewhat confident
10. How useful do you find the depression tool?	Not useful Somewhat useful Useful	Useful	Useful	Somewhat useful	Somewhat useful	Somewhat useful

One provider did not respond to the post-test survey. This was the provider who reported being very familiar with PHQ-9 and uses it as required. Out of the 5 respondents, 4 (80%) are familiar with PHQ-9 and are using it. One provider reported using Generalized Anxiety Disorder (GAD) screening tool which is not a depression screening tool. This provider reported being aware of PHQ-9 in contrast to her response in pre-test survey. She responded that the tool is not useful in her practice. Her response will be regarded as an outlier and will not be included. Of the 4 remaining providers, all reported being familiar

with PHQ-9 and are using it. Three providers reported being confident while one is somewhat confident in diagnosing depression. Also, 3 providers reported that they frequently use the tool during initial encounter with patients who complain of symptoms suggestive of depression while one provider reported not using it frequently. In terms of usage during initial encounter with patients who do not complain of symptoms suggestive of depression, 3 (75%) providers reported that they do not use it frequently while one reported never using it. Two of the providers reported using the PHQ-9 frequently during follow-up visits to assess response to treatment by patients receiving treatment for depression. The other two responded using it but not frequently. Two reported that they are confident with using the depression tool while the other two reported being somewhat confident. In terms of usefulness of the tool, 50% found it useful while the other half reported it as being somewhat useful.

Analysis

The purpose of this project was to improve the diagnosis and management of major depression using PHQ-9. Following intervention, the providers were expected to increase the frequency at which they utilize PHQ-9 during initial encounter with all new patients and during follow-up visits to assess response to treatment by those being managed for depression. Three of the providers who reported infrequent use of the tool during initial encounter with patients who complain of symptoms suggestive of depression in the pre-test survey reported frequent use after the educational intervention. There is also an improvement in the utilization rate during initial encounter of the providers with patients who do not complain of symptoms related to depression. Three providers who answered that they never use the tool during initial encounter with such patients reported using it though not frequently. This is better than not using the tool at all. With this reported use, the number of cases of depression that could have been missed might have been reduced. As a result, identified cases requiring intervention will be treated, hence preventing needless suffering by the patients. In assessing response to treatment, two providers who responded on the pretest survey that they never used the tool reported frequent usage following intervention. This is important as providers would be able to make a decision on whether to continue or modify current treatment. Moreover, using the tool provides the providers an opportunity for a subjective

assessment. From these results, it is noticeable there was an improvement in the utilization rate of the tool by some of the providers following the educational intervention.

Limitations

There were some limitations in phase two of this project. Unlike in phase one, there was no chart review. As a result, the actual utilization rate of the tool during initial and follow-up visits could not be determined.

Another limitation was the number of providers in the project. There were six providers who responded to the pre-test survey, but five responded to the post-test. Out of these five, one indicated that she uses GAD tool. With this number, the result of the study cannot be generalized.

The third limitation was the inconsistency in response pattern by some of the providers. For instance, a provider who reported that he finds the tool useful in pretest survey identified it as somewhat useful following intervention.

Conclusion

The educational intervention achieved a certain degree of success in this phase 2 of the project. Three providers who never used PHQ-9 during initial encounter with patients who do not complain of symptoms suggestive of depression reported using them following intervention. Although they indicated that the use was not done frequently. Three providers who reported infrequent use in during initial encounter with patients having complaints of depression reported using it in all such patients after the intervention. Two of the five providers who reported infrequent use of the tool during follow-up reported frequent usage in the post-survey. The educational intervention resulted in a positive outcome. The providers who identified the tool as being useful indicated their intention to incorporate it in their future clinical encounters with all new patients and to monitor response to treatment in those being treated for depression. Educating providers on the appropriate use of depression tool is very important as it would aid in identifying cases that would have been misdiagnosed. In addition, using the tool during follow-up visits provides a better strategy in assessing response to treatment. Therefore, the management of major

depression can be improved in primary care practice through educational intervention targeted on the use of depression screening tool such as PHQ-9 which has been validated in different clinical settings.

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Appendix A

Patient Health Questionnaire-9

	NOT AT ALL	SEVERAL DAYS	MORE THAN HALF DAYS	NEARLY EVERY DAY
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
Add columns	+	+	+	+

GRAND TOTAL: _____

10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	NOT VERY DIFFICULT AT ALL SOMEWHAT DIFFICULT VERY DIFFICULT EXTREMELY DIFFICULT

Appendix B

PHQ-9* Questionnaire for Depression Scoring and Interpretation Guide

Scoring:

Count the number (#) of boxes checked in a column. Multiply that number by the value indicated below, then add the subtotal to produce a total score. The possible range is 0-27. Use the table below to interpret the PHQ-9 score.

Not at all (#) x 0 =

Several days (#) x 1 =

More than half the days (#) x 2 =

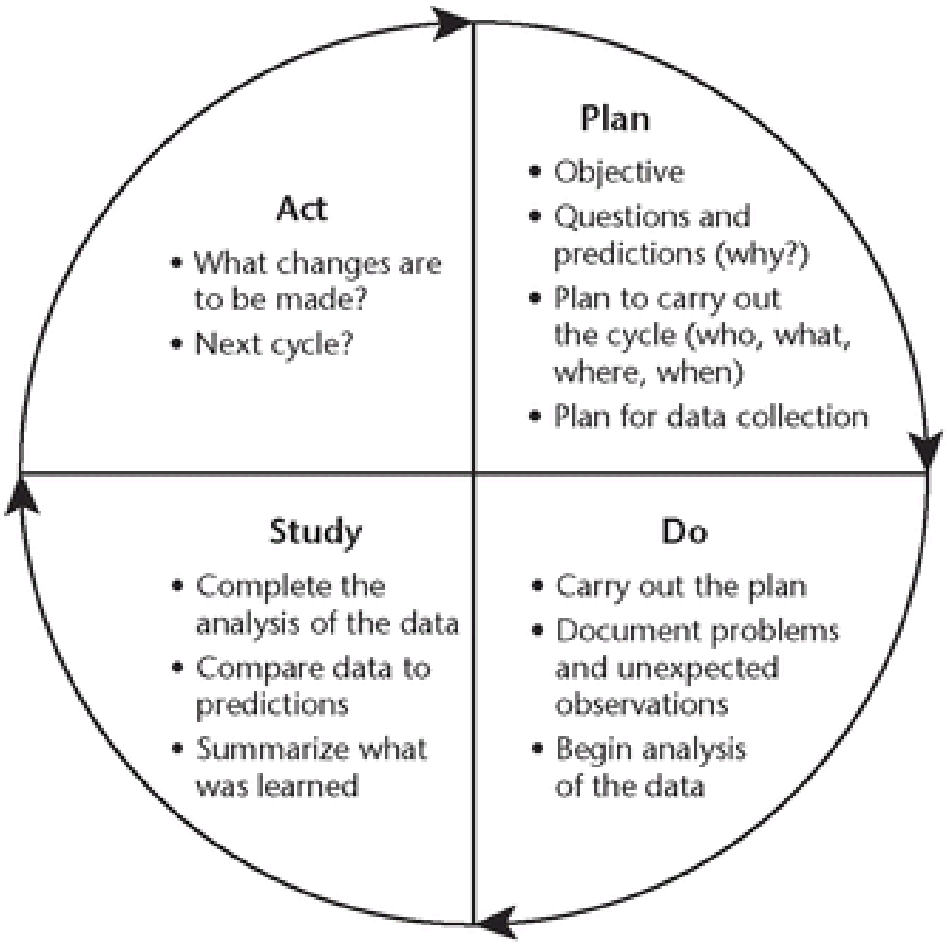
Nearly every day (#) x 3 =

Total score: _____

Interpreting PHQ-9 Scores	**Score**	**Action**	**Actions based on PHQ-**
Minimal depression	0-4	<4	The Score suggests that patient may not need depression treatment.
Mild depression	5-9		
Moderate depression	10-14	>5-14	Physician uses clinical judgment about treatment, based on patient's duration of symptoms and functional impairment
Moderately severe depression 15-19			
Severe depression	20-27	>15	Warrants treatment for depression, using antidepressant, psychotherapy and/or a combination of both

Appendix C

The PDSA Model



Appendix D:

Pre-test and Post-test Survey

Questions	Response
1. Are you familiar with any depression screening tool?	Yes/No
2. If yes to question 1, which one are you most familiar with?	
3. Are you familiar with Patient Health Questionnaire	Yes/No
4. If yes to question 3, do you use it? If you do not use it, why?	Yes/No ----------
5. How confident are you with assessing patients for depression?	Not Confident Somewhat confident Confident
6. How frequently do you use the tool during initial encounter with patients who complain of symptoms suggestive of depression?	Never Not frequently Frequently
7. How frequently do you use it during initial encounter with patients who do not complain of symptoms suggestive of depression?	Never Not frequently Frequently
8. How frequently do you use it during follow-up visits for patients receiving treatment for depression?	Never Not frequently Frequently
9. How confident/comfortable are you with using the depression tool?	Not Confident Somewhat confident Confident
10. How useful do you find the depression tool?	Not useful Somewhat useful Useful