SCREENING FOR DEPRESSION IN POST-STEM CELL TRANSPLANT PATIENTS USING THE PATIENT HEALTH QUESTIONNAIRE (PHQ)-2 AND PHQ-9

By

Margaret Foss, B.S.N., RN

University of Kansas School of Nursing

Submitted to the School of Nursing and The Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

Qiuhua Shen, Ph.D., APRN, RN

Faculty Project Committee, Chair

Lucinda Whitney, DNP, APRN, PMHNP-BC

Faculty Project Committee, Member

Jill Peltzer, Ph.D., APRN-CNS

Faculty Project Committee, Member

October 11, 2019

_____

Date Project Accepted

The DNP Project committee for Margaret Foss certifies that this is the approved version of the following DNP Project:

Screening for Depression in Post-Stem Cell Transplant Patients using the Patient Health Questionnaire (PHQ)-2 and PHQ-9

Qiuhua Shen, PhD, APRN, RN

_____

Chair

Lucinda Whitney, DNP, APRN, PMHNP-BC

_____

Member

Jill Peltzer, PhD, APRN-CNS

_____

Member

Date Approved: October 11, 2019

Abstract

Problem: Clinical depression is a complication of stem cell transplantation. Depression can decrease adherence to treatment, worsen transplant outcomes, and increase mortality. At the University of Kansas Cancer Center (KUCC)'s Blood and Marrow Transplant (BMT) clinic, new patients are screened for depression using the Distress Thermometer during their first visit. This screening practice does not identify depression among patients after transplant. It was therefore important to implement standardized depression screening for post-stem cell transplant patients.

Project Aims: The project aims of this quality improvement (QI) were: 1) to implement standardized screening tools (PHQ-2 and PHQ-9) for depression in this high-risk post-transplant patient population over 30 days, 2) to evaluate the effectiveness of PHQ-2 and PHQ-9 in detecting depression in post-transplant patients, and 3) to obtain feedback of the new screening process for depression from the medical assistants.

Project Methods: The Plan-Do-Study-Act cycle guided this QI project. All post-stem cell transplant patients were screened for depression using PHQ-2 and if their scores were positive, they were screened with the PHQ-9. Patients screened positive on the PHQ-9 were assessed by their healthcare providers on the same day of their visits. Providers would initiate an antidepressant medication and/or refer the patient to mental health services. The following information was reported for a 30-day implementation period: the number of patients who were screened positive for depression by the PHQ-2 and PHQ-9, the number referrals to mental health services, and the number of antidepressants prescribed. Medical assistant feedback regarding the new screening process for depression were also reported.

Findings: During the 30-day screening period, more than 200 post-transplant patients were screened for depression. Chart review were performed on a total of 101 randomly selected patients. Most of these patients (n = 100) were screened for depression using PHQ-2 and PHQ-9.

Nine patients had a positive PHQ-2 score (≥ 3) and received additional screening of PHQ-9. Eight patients were screened positive on the PHQ-9 (≥ 5) with four patients being newly diagnosed with depression. These four patients were either referred to mental health service and/or started on antidepressants. Medical assistant (MA) survey results showed that patients were willing to answer PHQ questions to the MA and the screening process took less than 3 minutes to complete. Most MA's expressed their willingness to continue PHQ screening.

Conclusion: The new screening process for depression using PHQ-2 and PHQ-9 was effective to identify patients with depression. It was also useful for healthcare providers to reassess the treatment plans for those with existing diagnosis of depression. It is recommended that the PHQ results should be automatically shown to the healthcare provider in the best practice advisory in assessment and plan. This will help better optimize PHQ use in the BMT clinic.

Contents

Screening for Depression in Post-Stem Cell Transplant Patients using the Patient Health Questionnaire (PHQ)-2 and PHQ-9

Clinical depression is a serious complication of stem cell transplantation and needs to be quickly diagnosed. Patients with transplantation are known to experience depression at an even higher rate (25-50%) than other oncology patients (10-25%) (Cooke, Gemmill, Karvits, & Grant, 2009; Hartung et al., 2017). The increased risk of depression for stem-cell transplant patients may result from lower physical quality of life during transplant, social isolation while neutropenic, prolonged hospital stays, and post-traumatic stress disorder (El-Jawahri et al., 2016).

Signs and symptoms of depression such as fatigue, loss of appetite, weight changes, cognitive decline, and insomnia often overlap with side effects of chemotherapy treatments, making depression easily overlooked by oncological healthcare providers (Smith, 2015). Patients with depression have a decreased ability to manage their own healthcare. Most significantly, there is an association between depression and increased mortality (Siu, 2016). Depression can increase unhealthy behaviors such as smoking and alcohol use (Fann et al., 2009). Depressive symptoms in transplant patients lowers cognitive functioning, memory, executive decision making, attention, and visuospatial learning (Ghazikhanian et al., 2017).

Several studies support the association between depression and cancer-related mortality, with an increased risk of mortality between 19% (Pinquart & Duberstein, 2010). In another study, researchers 26% (Smith, 2015), and 39% (Satin, Linden, & Phillips, 2009). Research varies on the extent that clinical depression increases the mortality rate of oncology patients; however, it is consistent that depression intensifies mortality in patients with stem cell transplant. Therefore, it is a significant complication for this patient population.

Problem Statement

Patients undergoing a stem cell transplant should be routinely screened for depression to minimize the complications of this serious mental health disorder. Patients facing a barrage of somatic symptoms sometimes forget to discuss psychological changes within the limited time they have to speak with their healthcare providers; they may also be uncomfortable bringing up mental health concerns (Braamse et al., 2015). Untreated depression may lower adherence to treatment and increase the risk for mortality. Routine screening could improve upon the speed of detection of depression in this vulnerable population potentially improving quality of life and minimizing adverse outcomes.

The BMT clinic at the University of Kansas Cancer Center (KUCC) provides stem cell transplantation to over 300 patients annually. Currently, the Distress Thermometer (DT) is used to screen new patients at their first visit to assess emotional problems including depression, fear, nervousness, sadness, worry, or loss of interest (National Comprehensive Cancer Network [NCCN], 2016). However, the DT is not specifically intended to screen for depression and there is no standardized process for screening patients after their first visit.

Therefore, the purpose of this QI project was to implement a standardized screening process for depression using the Patient Health Questionnaire (PHQ)-2 and PHQ-9 among patients receiving stem cell transplantation at KUCC BMT clinic. Standardized screening allowed for the identification of patients who suffer from depression and development of treatment plans.

Background and Significance

Depression in Transplant Patients

Research has shown that depression must be taken seriously as a co-morbidity in transplant patients since it can negatively affect patients' adherence to treatment and increase mortality. The post-transplant population faces unique challenges that increase their risk for depression, including graft-versus-host-disease (GVHD) and neutropenic isolation (Battiwalla, Tichelli, & Majhail, 2016; Tecchio et al., 2013). Researchers found that transplant patients found 25.5% had depression 6-7 weeks after transplant when only 4.2% had depression before transplant (Fann et al., 2009). A different study found 43.3% of patients had depression six months post-transplant (El-Jawahri et al., 2016). In another study of post-transplant patients, 34% had depression one year after transplant (Vaezi, Gharib, Souri, & Ghavamzadeh, 2015).

The standard of care treatments such as chemotherapy and radiation that transplant patients receive may worsen depression by producing pro-inflammatory cytokines that lower synaptic concentrations of serotonin and noradrenaline, neurotransmitters that have a role in depression (Smith, 2015). Patients with depression can have elevated levels of the hormone cortisol; elevated cortisol levels promote the growth of cancer cells and cause increased mortality (Pinquart & Duberstein, 2010). Depression is a risk factor for poor patient outcomes, and it is critical that transplant patients be evaluated for depression and referred to mental health services for treatment.

Depression could affect transplant outcomes by reducing patient's adherence to treatment regimens (Jim et al., 2016). Post-transplant patients with depression were less likely to follow medical recommendations after transplant for personal hygiene, prescribed exercise, neutropenic diets, and taking prescription medications (Mumby et al., 2012). In addition, research has shown that depression adversely affects transplant outcomes in the following metrics: increased hospital

length of stay, increased hospital readmissions, greater mortality, and slower engraftment of neutrophils (Jim et al., 2016; Mumby et al., 2012).

Suicidal ideation is a rare and serious complication for 5% of patients with severe GVHD experience (Battiwalla et al., 2016). Risk factors for suicide ideation specifically for this population include patients with relapsed disease, GHVD, age older than 65 and male (Battiwalla et al., 2016; Tichelli et al., 2013). Although death by suicide is rare in the BMT population, their absolute excess rate of death by suicide is 20.91 times higher than the general population for both types of transplant (Battiwalla et al., 2016). Depression in transplant patients raises suicidal ideation by 13 times (Jim et al., 2016). Detecting depression in this critically ill population is central to improving quality of life, patient adherence to treatment, and decreasing mortality rates.

Diagnostic Criteria of Major Depressive Disorder

Types of depression are differentiated in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V). The DSM-V is the benchmark reference book used by mental health providers for descriptions, symptoms, and diagnostic criteria. Types of depression include major depressive disorder (MDD), persistent depressive disorder (dysthymia), disruptive mood dysregulation disorder, premenstrual dysphoric disorder, substance-induced depressive disorder, peri or post-partum depression, minor depression, and unspecified depression (American Psychiatric Association, 2013). The diagnostic criteria for MDD require presences of five or more of the following symptoms on more than half of the days or nearly every day during the same 2-week period with at least one of the symptoms being depressed mood or loss of interest or pleasure: 1) depressed or irritable mood, 2) decreased interest or pleasure, 3) significant weight loss or gain >5% or change in appetite, 4) change in sleep (hypersomnia or insomnia), 5)

change in activity (psychomotor agitation or retardation), 6) fatigue or loss of energy, 7) guilt or worthlessness, 8) diminished concentration or indecisiveness, and/or 9) thoughts of suicide or death (American Psychiatric Association, 2013). Depending on the number of total symptoms, the diagnosis of major depressive disorder is graded into categories of mild, moderate or severe (American Psychiatric Association, 2013). The most auspicious presenting sign for depression is loss of interest in normally pleasurable activities or *anhedonia* (Ward & Garlow, 2019). Insomnia should be investigated by the healthcare provider because waking up in the middle of the night or early awakening without being able to return to sleep is indicative of depression rather than another medical condition (Ward & Garlow, 2019). A full outline of the DSM-V diagnostic criteria for MDD can be found in Appendix A.

Screening Tools for Depression

In the literature, there are many standardized tools available to screen for depression. Examples of these screening tools include: NCCN's Distress Thermometer (NCCN-DT), the Functional Assessment of Cancer Therapy-Bone Marrow Transplant (FACT-BMT), Hospital Anxiety and Depression Scale (HADS), the Beck Depression Inventory (BDI), the Epidemiologic Studies Depression Scale Revised (CESD-R), European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), the PHQ-9, and PHQ-2.

NCCN Distress Thermometer (NCCN-DT). The distress thermometer was designed by the NCCN specifically for oncology patients (NCCN, 2016). It asks questions in yes/no format and assesses a patient's overall feeling of distress in a 0 to 10 thermometer visual scale (NCCN, 2016). The NCCN has three questions that assess for depression, sadness, or loss of interest in usual activities (NCCN, 2016) and three other questions that test for anxiety problems. The

majority of the NCCN questions, 33 of a total 40, assesses for practical problems such as childcare, housing, transportation, work, school, and physical symptoms like diarrhea, fevers, swelling, constipation, urination changes, breathing, mouth sores, mobility, nausea, pain, or sexual dysfunction (NCCN, 2016). A complete example of the NCCN-DT tool is in Appendix B.

Functional Assessment of Cancer Therapy-Bone Marrow Transplant (FACT-BMT). FACT-BMT is a quality of life tool developed for post-transplant (McQuellon et al., 1997). The FACT-BMT tool is a 47-question, 11-category, assessment of well-being designed to compare pre-transplant baseline well-being at hospital discharge and 100 days post-transplant (McQuellon et al., 1997). The FACT-BMT assesses for physical, emotional, functional and social well-being, treatment outcome, relationship with doctor, and bone marrow transplant outcome (McQuellon et al., 1997). The FACT-BMT tool is specific to stem cell transplant patients and does not primarily focus on signs and symptoms of depression.

Hospital Anxiety and Depression Scale (HADS). The HADS has 14 questions directed to measuring anxiety and depression. The HADS was designed to identify depression in patients with chronic medical conditions and it is mediocre at detecting depression when compared to other available screening tools (Bjelland, Dahl, Tangen Haug, & Neckelmann, 2002).

Beck Depression Inventory (BDI). The BDI is a patient administered inventory designed to measure the severity of depression (Beauvais, Martino, Walker, Roback, & Welch, 2019). It consists of 21 multiple-choice questions. The scoring of the BDI ranges from 0 to 63 with higher score indicative of severe depressive symptoms. The BDI results are quantitative, meaning that depressive symptoms which could be monitored over time (Beauvais et al., 2019). The BDI is not the most efficient screening tool because it may take a patient up to 10 minutes to complete. (Beauvais et al., 2019).

Center for epidemiologic studies depression scale revised (CESD-R). The CESD-R is an open-access tool for depression screening (Center for Innovative Public Health Research [CIPHR], 2019). It has 20 questions that focus on the common symptoms of MDD including sadness, loss of interest, appetite, sleep, thinking, concentration, fatigue, suicidal ideation, and guilt (CIPHR, 2019). Scoring is based on the number of days in the last two weeks the patient has had depressive symptoms (CIPHR, 2019). It was designed to screen undertreated populations including the elderly and lower socioeconomical populations, but it was not originally designated for oncology patients (CIPHR, 2019). The CESD-R has been such a popular depression screening tool that has been retested amongst oncology populations and found to be proficient for this specific population (Chhabria & Carnaby, 2017).

European Organisation for Research and Treatment Quality of Life of Cancer Patients (EORTC QLQ-C30). The Quality of Life questionnaire EORTC QLQ-C30 has 30 questions about depression, activities of daily living, somatic symptoms, and pain using a Likert scale of 1-4 (Hinz et al., 2016). This screening tool was developed to evaluate quality of life in oncology patients. It is copyrighted and a licensing agreement is required if used in a non-academic setting such as clinics. It is not designed for depression and instead focuses on monitoring overall quality of life in oncology patients.

Patient Health Questionnaire (PHQ)-2. The patient health questionnaire (PHQ)-2 is the initial two-question screening to see if patients need a full PHQ-9 depression screening. The PHQ-2 questions and scoring system are displayed in Appendix C. The two questions assess for the presence of depressed mood and loss of interest or pleasure in doing things over a 2-week period. The response options are 0-not at all, 1-several days, 2-more than half of the days, and 3-

nearly every day. The scoring of PHQ-2 ranges from 0 to 6. When the score of PHQ-2 is 3 or greater, it is recommended to reflexively use the PHQ-9 to further evaluate for depression.

One concern with PHQ-2 screening is that it has a low ability to discern between somatic symptoms of fatigue, insomnia, and lack of interest from clinical depression. This could contribute to a relatively low positive predictive value (25%) found in oncology patients (Thekkumpurath et al., 2011). However, the psychometric evaluation of the PHQ-2 strongly supported its validity as a brief depression screening tool (Kroenke, Spitzer, & Williams, 2003). Wagner and associates (2017) reported that a PHQ-2 had equivalent psychometric properties as PHQ-9 among oncology patients and it was more efficient than the NCCN-DT in detecting depressive symptoms over the course of a patient's treatment. The use of PHQ-2 is considered the first step to screen for depression and its brevity makes it suitable to use in busy clinic settings.

Patient Health Questionnaire (PHQ)-9. The PHQ-9 is a 9-item self-administered depression screening tool. The PHQ-9 assesses both somatic and affective-cognitive symptoms of depression. Somatic symptoms are insomnia, loss of energy, and appetite problems; affective-cognitive symptoms are feeling depressed, self-blame, and suicidal ideation (Hinz et al., 2016). The PHQ-9 could help distinguish cancer treatment related somatic symptoms from depression specific symptoms. PHQ-9 is a unique tool because the screening questions align with the diagnostic criteria in the DSM-V (Thekkumpurath et al., 2011). The PHQ-9 questions are listed in Appendix D. The response options are 0-not at all, 1-several days, 2-more than half of the days, and 3-nearly every day. The scoring of PHQ-9 ranges from 0 to 27. Total scores indicate the level of depression; 5-9 is mild, 10-14 moderate, 15-19 moderate severe, and 20-27 is severe depression. See the PHQ-9 scoring system and diagnosis guide in Appendix E.

Research has shown that the PHQ-9 is a reliable and valid screening tool for depression for the general population and oncology patient (Thekkumpurath et al., 2011). For example, Cronbach's alpha (internal consistency reliability index) was ≥ 0.84 when the PHQ-9 was used in 2,059 cancer patients (Hinz et al., 2016). The PHQ-9 has good sensitivity (93%), specificity (81%), positive predictive value (52%), and negative predictive value (99.4%) for major depressive disorder when using in oncology patients (n = 4,264) (Thekkumpurath et al., 2011).

The literature clearly supports that the PHQ-2 and PHQ-9 are preferred screening tool for depression among oncology patients, when comparing to screening tools like the NCCN-DT, FACT-BMT, HADS, BDI, CESD-R, and the EORTC QLQ-C30.

Screening Frequency for Depression

The United States Preventive Service Task Force (USPSTF) recommends an annual PHQ screening for persons aged 12 or above (USPSTF, 2016). For any patients with depression, it is recommended to recheck PHQ scoring as often as every week to four weeks depending on treatment plan and severity of PHQ scores (New York State Department of Health, 2016). The ideal depression screening interval for post-transplant patients is less clear. There is no consensus on the screening frequency but due to the higher incidence of depression in BMT patients, more frequent screening is warranted. Artherholt, Hong, Berry, and Fann (2014) observed that BMT patients have peak depression at six weeks post-transplant and recommended at least one PHQ screening by the benchmark of six weeks post-transplant (Artherholt, Hong, Berry, & Fann, 2014). Since the PHQ-2 and PHQ-9 asks about depressive symptoms in the past two weeks, suggesting the minimum screening interval of two weeks.

Project Aims

This QI project was conducted at the BMT Center of KUCC aiming to improve the recognition and treatment of depression in the high-risk post-transplant patient population. The

three specific aims of the project were: 1) to implement standardized screening tools (PHQ-2 and PHQ-9) for depression in this high-risk post-transplant patient population over 30 days, 2) to evaluate the effectiveness of PHQ-2 and PHQ-9 in detecting depression in post-transplant patients, and 3) to obtain feedback of the new screening process for depression from the medical assistants.

Project Questions

1. How many post-transplant patients at the BMT clinic were screened for depression over 30 days?
2. How many post-transplant patients at the BMT clinic were screened positive on the PHQ-2 over 30 days?
3. How many post-transplant patients at the BMT clinic were screened positive on the PHQ-9 over 30 days?
4. How many post-transplant patients at the BMT clinic were referred to mental health services over 30 days?
5. What feedback did the medical assistants have regarding the new screening process for depression?

Theoretical Framework

The Plan-Do-Study-Act (PDSA) cycle was used to guide this QI project (United States Department of Health and Human Services, 2008). The PDSA was developed by the Institute for Healthcare Improvement Model (U.S. HHS, 2008). This PDSA framework outlines how to implement QI projects in healthcare settings by planning the project, trying the project, observing the project results, and acting on the analysis of the results (U.S. HHS, 2008).

For this project the PDSA outlined specific implementation stages for the QI. The *planning stage* was initiated by discussing the project idea with nursing leadership at KUCC BMT clinic, developing the DNP project proposal and applying for Institutional Review Board (IRB) approval. The *do stage* included educating staff, adding PHQ to the document flowsheet, and implementing screening of patients during office visits. The *study stage* was the analysis of collected data, and evaluation of the success of the implementation of the PHQ-2 and PHQ-9 screening tools in the BMT setting. The *act stage* included recommendations of modifications to screening and referral process based on the project findings, which is included in the Discussion section of this paper.

Assumptions

A major assumption of the project was that BMT providers were willing to use PHQ scores to make the diagnosis of depression. Healthcare providers at the BMT clinic may have avoided giving depression diagnoses for their patients due to fear of stigmatization, confrontations, and/or alienation of their patients; which are common barriers identified by all providers in diagnosing depression (Colligan, Cross-Barnet, Lloyd, & McNeely, 2018). Colligan et al., (2018) found that healthcare providers who are successful at screening for depression, had the ability to establish trusting relationships with patients by using common language instead of jargon (Colligan et al., 2018). For that reason, BMT providers were advised to avoid jargon when assessing patients who are screened positive on PHQ-9.

A second potential limitation in screening patients for depression was that patients may refuse screening for mental health symptoms. In a previous study of psychological interventions for transplant patients only 61.1% of patients agreed to screening; study participants cited a lack of energy and lack of interest in psychological problems as the primary reasons for refusal

(Braamse et al., 2015). Patients may also have incentive to under-report symptoms to avoid the stigma of mental illness. This project tried to avoid this potential pitfall of non-participation by having a short-scripted introduction before PHQ questions were asked. For example, the medical assistant staff would say “Now I would like to ask you some questions about your mood, please consider the questions carefully. This may help your nurse practitioner or physician improve your care”.

A final consideration was given to how to effectively screen for depression without wasting clinical time. In support of the plan, a study of 342 oncology patients found the PHQ-9 screening to be generally feasible to include in a patient exam by adding the screening to the computerized data collected at a regular patient visit along with pain score and vital signs (Fann et al., 2009). Only 50% of patients required a full PHQ-9 screening (Fann et al., 2009), which only takes an estimated 2.5 minutes for most patients (Thekkumpurath et al., 2011; Fann et al., 2009). Using the PHQ-2 as the first step of screening can minimize the use of clinical time as only those screened positive will require PHD-9 (Wagner et al., 2017).

Project Methodology

Design

The purpose of this quality improvement (QI) project was to implement a standardized depression screening process in outpatient post-BMT patients using the PHQ-2 and PHQ-9 for 30 days. The Project Director educated all outpatient staff about how to administer the PHQ depression screening tools by emails and presentation at department staff meetings in May 2019. Education about the incidence of depression and the impact of depression on patient outcomes was discussed before medical assistants were given education on how to perform the screening using PHQ-2 and PHQ-9. When this project was implemented from June 10 to July 7, 2019, all

clinic staff were given additional motivation to complete the screening by educating them about the complications of depression in the BMT population.

The Patient Health Questionnaire (PHQ) was built into Epic, the current electronic health record (EHR) that the University of Kansas Health System uses. The BMT medical assistant staff were trained to enter the scores of PHQ-2 and PHQ-9 in EHR for all post-transplant patients in the clinic for outpatient provider visits. A laminated copy of the PHQ-2 and PHQ-9 was kept in each exam and treatment room for patients to follow along as the medical assistant read aloud the PHQ questions to the patient. This was intended to reduce the screening time by allowing patients to read the questions and visualize the Likert scoring system. Patients that had positive PHQ-2 screenings were further screened using PHQ-9. Medical staff reported positive scores to the healthcare provider seeing the patient that day.

Setting

This QI project was conducted at the BMT clinic in the University of Kansas Health System. It is an outpatient clinical unit in the Bloch Cancer Care Pavilion, in Westwood, Kansas. Patients are referred to BMT from community oncologists for two main types of stem cell transplant: autologous when they receive their own cells and allogeneic when they receive another person's stem cells. An average of 60-100 patients are seen each weekday in provider visits. The support letter for this project from clinical leadership can be found in Appendix F.

Sample

The eligible patient participants for the project included all the patients who have previously undergone stem cell transplant and have scheduled visits with either advanced practice registered nurses or physicians during the 30-day implementation period. These post-transplant patients originally had life-threatening primary oncological diagnoses such as multiple

myeloma, acute myeloma leukemia, acute lymphoblastic leukemia, chronic myeloid leukemia, diffuse large B cell lymphoma, mantle cell lymphoma, Non-Hodgkin's Lymphoma, aplastic anemia, or sickle cell anemia. Subjects were limited to English and Spanish speakers due to the PHQ being freely available in those languages. Subjects with known learning disabilities or cognitive disorders were excluded.

Procedures

The PHQ screening questions (PHQ-2 and PHQ-9) were completed by the patient under the direction of the medical assistant during the rooming process for 30 days. The Epic EHR has the PHQ built into the document flowsheet. The Epic computer software automatically calculated the patients' total scores as the staff member entered the patient's answers. All post-transplant patients were initially screened with the PHQ-2 tool.

Initial screening with PHQ-2. The initial screening PHQ-2 (Appendix C) includes two questions of a) over that last two weeks, how often have you been bothered by the following problems: feeling down, depressed, irritable, or hopeless? and b) had little interest or pleasure in doing things? (Siu, 2016). The subject rated their responses on a Likert scale of not at all (0), several days (1), more than half the days (2), or nearly every day (3) (Siu, 2016). A total score of 3 or more on the PHQ-2 indicates positive screening and requires further evaluation using the PHQ-9.

Further evaluation with PHQ-9. The PHQ-9 (Appendix D) tool contains nine questions that ask if the subject in the last two weeks has felt a) little pleasure or interest in doing things, b) feeling down, depressed or holes, c) sleeping too little or too much, d) feeling tired or having little energy, e) poor appetite or overeating, f) feeling bad about yourself or that you are a failure or have let your family down, g) concentration problems, h) moving or speaking so slowly that

other people could have noticed or being so fidgety or restless that you have been moving around a lot more than usual, and i) thoughts that you would be better off dead or hurting yourself in some way (Siu, 2016). These nine questions are scored on a Likert scale of not at all (0), several days (1), more than half the days (2), or nearly every day (3). The total PHQ-9 score can range from 0 to 27. A PHQ-9 score of greater than 4 is positive screening. Higher PHQ-9 score indicates the severity of depression (mild: 5-9; moderate: 10-14; moderately severe: 15-19; and severe: 20-27) (Appendix E).

A positive screening on the PHQ-9 (a score > 4) was reported to the healthcare providers (APRN or physicians) who were seeing the patients that day. Treatment considerations depended on the severity of depression according to the PHQ-9 scores. For a patient with a PHQ-9 score of 5-9 (mild depression), the healthcare provider seeing the patient that day was informed. While antidepressant treatment may not be indicated, these patients were rescreened about two weeks later on their return visits. Patients that score between 10-27 were evaluated for major depressive disorder based on DSM-V criteria (Fann et al., 2009). A depressed mood or a lack of interest or pleasure in doing things are two cardinal symptoms of depression, which must be endorsed by a patient for a positive PHQ-9 (Siu, 2016). Patients with PHQ-9 scores for moderate (10-14) or moderately severe depression (15-19) were offered to start an antidepressant medication and/or a referral to mental health services. Patients with PHQ-9 score of severely depressed (20-27) were offered both initiation of an antidepressant and emergent referral to mental health provider. The healthcare provider seeing the patient the same day of the PHQ screening placed the orders for antidepressant medication and/or ambulatory referral to mental health provider.

Patients with positive PHQ screenings required a skillful evaluation by a healthcare provider to receive a diagnosis of depression and to develop a treatment plan using a shared

decision-making model. When patients screened positive for PHQ but are not seen regularly at the BMT clinic, their primary care provider were notified of the score and the need for a follow-up assessment. When PHQ-9 scores were above 4 and/or the patient had a current diagnosis of depression, the patient was rescreened about two weeks later at their next scheduled visit. Patients whom were not diagnosed with depression they were re-screened at their next scheduled appointment.

Data Collection

The main outcomes of the project were: 1) number of PHQ screenings completed on post-transplant patient visits during the 30-day period, 2) number of patients screened positive for depression (PHQ-2 and PHQ-9), and 3) number of patients who were referred for psychologist services. Data were collected by reviewing the EHR. The Project Director randomly selected 100 EHRs of post-transplant patients who were seen during June 3 through July 7th, 2019 after 30 days of implementation of PHQ screening. A sample size of 100 patients was desired to ensure an adequate data set to evaluate our project questions without being too large of an amount of data to be able to see patterns in the results.

A data collection spreadsheet was used to record data (Appendix H). Data collected from post PHQ screening implementation included transplant type, PHQ-2 and if available PHQ-9 scores, referrals to psychologist, antidepressant prescriptions, and depression diagnosis. Basic demographic information such as age, gender, and ethnicity were also collected. Patients who did not complete PHQ screening questions were also recorded in order to consider how many post-transplant patients have benefited from depression screening. Patient's transplant type was found in provider notes. PHQ scores and dates were found the EHR under document flowchart. Depression diagnosis was found on the patient's problem list on their snapshot. Referrals to

psychology or palliative care were found under referrals tab on the EHR chart review. Prescriptions for antidepressants were found on the patient's medication list.

Finally, the sustainability of the new screening process for depression was gauged by the MA's opinions on the screening. All medical assistants (n = 11) at KUCC BMT clinic were invited to complete a short Medical Assistant Post Implementation Survey anonymously after the 30-day implementation period in July 2019. The survey focused on the feedback from the MA's regarding time to perform the screening, patients' cooperation in screening, and their willingness to continue screenings in the future (Appendix G). The survey also had a free text space for additional comments. The survey was developed and distributed using SurveyMonkey® website.

Evaluation

Descriptive statistics (mean and standard deviation [SD]) were calculated to describe the continuous variables including age, PHQ-2 and PHQ-9 scores. Frequency and percentage were used to report categorical variables such as gender, race/ethnicity transplant types, number of patients who completed PHQ-2, number of patients screened positive for PHQ-2 and completed the PHQ-9, number of patients screened positive for PHQ-9. The number of post-transplant patients who were referred to mental health services and/or started on antidepressants were also reported. It was originally planned to compare differences in the means of PHQ-9 scores by the two different transplant types using the t-test. However, this was not performed due to small subsample size. Descriptive statistics (number and frequency) were used to report results from Medical Assistant Post Implementation Survey. Additional narrative comments were summarized and reported.

Human Subject Protection

An application for determination of this QI project was submitted and approved by the Institutional Review Board (IRB) at the University of Kansas Medical Center in May 2019. The project was initiated in May 2019 when the IRB approval was received. Informed consent was not sought from patients as this QI was part of normal health care operations at the KUCC BMT clinic. Patient protected health information (PHI) was only accessed when the Project Director opened the patients' EHR to collect data pertinent to the evaluation of the project. Only non-PHI data was collected to measure the change in practice as a result of the QI project. Standard confidentially of patient visits and diagnoses was maintained to staff directly involved in the patient's care.

Patients were immediately de-identified in data collection phase in order to protect their privacy. The Project Director accessed the EHR after the implementation period was completed and collected all necessary information from the chart in a single viewing and record data without unique patient identifiers. Name, date of birth, and medical record number were excluded. The de-identified data were stored in an electronic format on a password protected computer with antiviral software. Only aggregated data were reported in this final report of the project findings.

Results

Characteristics of Project Participants

More than 200 post-transplant patients were screened for depression using PHQ-2 and PHQ-9 during the 30-day implementation period. A total of 101 EHRs of these patients were randomly selected to retrieve demographic information and the PHQ screening results. Most patients (n = 100, 99%) were willing to be screened for depression with only one (1%) who declined. The mean age of screened patients was 54.2 years old and over half (54%) were male.

Most screened patients (n = 87, 88%) were European American, followed by Hispanic (n = 7, 7%), African American (n = 4, 4%), and Asian (n = 2, 2%) (Figure 1). For the types of transplant, 26 patients had a history of autologous stem cell transplant (25.7%) and 75 had a history of allogeneic stem cell transplant (74.3%).

Positive PHQ-2 and PHQ-9 Screening

The mean PHQ-2 score for all 100 screened patients was 0.82 (SD = 1.20). There were only nine patients (9%) who scored 3 or 4 on their PHQ-2 and required a subsequent PHQ-9 screening (Figure 2). Of these nine patients who had completed the PHQ-9, the mean score of PHQ-9 was 10.11 (SD = 3.70). Eight of the 9 patients were screened positive on PHQ-9 (89%). Among the eight positive PHQ-9 screening, three (37.5%) had mild depression (a PHQ-9 score of 5 - 9), four (50%) had moderate depression (a PHQ-9 score of 10 - 14), and one (12.5%) had moderately severe depression (a PHQ-9 score of 15 - 19). None of the eight patients had severe depression, PHQ score of 20 - 27. Distribution of depression by severity and transplant types among the eight patients screened positive by PHQ-9 were presented in Figure 3.

Evaluating the eight patients who screened positive on the PHQ-9, seven had allogeneic transplant and one had autologous transplant. Among the allogeneic patients who screened positive on the PHQ-9, three had mild depression, three had moderate depression, and one had moderately severe depression (Figure 3). The one autologous transplant patient was screened positive for moderate depression on PHQ-9 (Figure 3). Since there were only nine patients who required PHQ-9 screening with only one being the autologous transplant, t-test was not performed to compare PHQ-9 scores by transplant type as originally planned. Of the total 17 newly or existing diagnoses of depression in the project sample, 16 of those patients had allogeneic stem cell transplant history.

Four patients (4%) out of the 100 were newly screened positive for depression during this implementation period. There were 13 (13%) patients who had existing depression diagnoses based on EHR review. However, nine out of 13 with pre-existing diagnoses of depression did not screen positive for active depression symptoms with the PHQ tools. All patients with pre-existing diagnosis of depression (n = 13) had received allogeneic stem cell transplant. None of the autologous stem cell transplant patients had existing diagnoses of depression.

Treatment Plans for Positive PHQ-9 Screening

The review of treatment plans for patients whom screened positive on PHQ-9 showed four patients had existing referrals to psychologists and three patients had new referrals placed after screening positive on the PHQ-9 (Figure 4). However, one allogeneic patient with newly positive screening on PHQ-9 was not referred as recommended. Eight patients had existing antidepressant prescriptions and three new antidepressant prescriptions were written after positive PHQ-9 screening. One autologous patient screening positive for depression declined an antidepressant (7.14%) (Figure 5). One positive PHQ allogeneic patient was not offered an antidepressant (7.14%) (Figure 5). Almost all patients on existing antidepressant prescriptions or offered new prescriptions had allogeneic transplant histories (n = 12, 85.72%).

Feedback from Medical Assistants

The Medical Assistant Post Implementation survey was sent via emails after the 30-day trial period in July 2019. All 11 medical assistants were invited to complete the survey. A total of 7 MAs responded with a response rate of 64%. One MA was on family medical leave and was not able to respond. Another three MA's chose not to respond. Results of feedback from Medical Assistants were summarized in Figure 6. The first question asks, "Did the PHQ-2 and PHQ-9 surveys take you less than 3 minutes to complete on average?". Majority of MAs (n = 6, 85.7%)

responded “yes”. All MAs (n = 7, 100%) found that patients were willing to answer PHQ questions during the rooming process. Majority of MAs (n = 6, 85.7%) expressed their willingness to continue the screening process. Three MAs provided narratives in the comments section. However, only one comment seemed to be applicable to the project (“Question 1 people tend to struggle with so probably look into rewording it”). It was unclear which questionnaire (PHQ-2 or PHQ-9 or the medical assistant survey itself) the respondent with this comment referred to.

Discussion

This quality improvement project was to implement a new screening process for depression using PHQ-2 and PHQ-9 among patients receiving post stem cell transplants at the BMT Center of KUCC. During the 30-day implementation period, most patients (n = 100, 99%) participated in the new screening for depression among the 101 charts reviewed. One patient declined screening. The participation rate was much higher than anticipated. In a previous study of transplant patients, only 61.1% of patients agreed to screening due to lack of energy and lack of interest (Braamse et al., 2015). The new screening process identified a total of nine patients (9%) with a positive PHQ-2 score (≥ 3) and eight patients (8%) with a positive PHQ-9 score (≥ 5). Four of the eight patients screened positive on the PHQ-9 were newly identified and the other four had an existing diagnosis of depression on their EHR. There were additional nine patients who had an existing diagnosis of depression but were screened negative during the 30-day screening period. Therefore, the proportion of patients with depression (either an existing diagnosis of depression or screened positive on the PHQ-9) were 17% among the 100 screened patients. This was relatively lower than the reported 25-50% among transplant patient population (Cooke, Gemmill, Karvits, & Grant, 2009). This could be due to the short screening period (30

days) and not allowing for a second cycle of quality improvement plan-do-study-act to reinforce process changes and make improvements in staff education.

All patients in the sample with a pre-existing history of depression (n =13) had received allogeneic transplants. Similarly, most patients who newly screened positive for depression using the PHQ-9 (n = 7, 87.5%) had a history of allogeneic transplant. It appears that in this project sample, patients with allogeneic transplant had a much higher incidence of depression than those with the autologous transplant. This was not consistent with a previous study where it was reported that autologous patients (n = 30) had psychological distress scores than allogeneic patients (n = 60) and higher PHQ-9 scores by 2.45 on average (El-Jawahri et al., 2014). This could be explained by that the autologous patients typically had more lifetime cycles of chemotherapy due to their primary oncology disease and lower quality of life going into transplant (El-Jawahri et al., 2014). It is unfortunate that due to a too small sample size for the autologous patients requiring PHQ-9 test that a t-test was not performed to compare group differences in PHQ-9 scores by these two transplant types. Future investigation is warranted to compare KU BMT transplant types to nationwide transplant patients.

Healthcare providers in BMT seemed ready to use PHQ-9 scoring to diagnose depression and to reassess exiting depression diagnoses. All four patients who were newly screened positive on the PHQ-9 were given diagnosis of depression and offered antidepressants or referrals to mental health specialists. All three patients with pre-existing depression diagnoses and a positive PHQ-9 score were either already on antidepressants or had a previous mental health referral. A missed opportunity for depression treatment was identified for one allogenic patient with moderate depression (PHQ-9 score 13) who was not referred to a mental health specialist, but was given a new prescription for an antidepressant. Another allogeneic patient with moderate

depression (PHQ-9 score 14) was not offered an antidepressant but had an existing referral to mental health specialist. PHQ scoring guidance recommendations patients who have moderate depression (a PHQ-9 score of 10-14) could benefit from both mental health referrals and antidepressant based on the duration of patients' symptoms and functional impairment. Perhaps these patients did not need both antidepressant and referral based on the clinical evaluation of their depression but no documentation of this was discussed in the progress note.

The significance of this QI project is three-fold. First, this screening process supported the efficient screening, diagnosing, and provider reassessment of existing depression with a quantitative metric for depressive symptoms. It is significant that most patients screened (n = 92) had negative PHQ-2 scores. Depression was newly identified in four patients (4%) during the implementation phase of this project. Four patients with existing depression had positive PHQ-9 scores that were reported to the healthcare provider seeing the patient that day. The PHQ-9 results greatly assist the healthcare provider in making a new diagnosis of depression as it addresses all the DSM-V criteria. The healthcare provider merely needed to confirm the PHQ-9 results with the patient and make the diagnosis. Nurse practitioners should lead this practice change to incorporate depression assessments into cancer treatment. As providers strive to practice based upon evidence-based findings, adequate treatment of depression proves to be an important part of care for transplant patients.

Second, the PHQ tool gives a quantitative number for healthcare providers to reassess existing depression diagnoses in terms of mild, moderate, moderately severe, and severe and helps determine if depression is active or in remission. The PHQ tool does assist healthcare providers to make informed decisions in modifying a patient's depression treatment.

Third, the PHQ-2 and PHQ-9 is an efficient screening tool for depression. Most surveyed medical assistants (n = 6, 85.71%) reported that the screening took less than three minutes and they were willing to continue the screening process in their rooming workflow. Despite the efficiency, a concern of use of clinical staff time has been a perceived barrier. Continuing to use this screening tool has faced objection due to overall time spent screening patients for fall risk, pain, fatigue, suicide ideation, and caregiver distress. All these routine screenings add time to the rooming process but not as much as the perceived effort. In actual timed trials it only takes a Medical Assistant 2.5 minutes, on average, to complete the entire PHQ-9 (Thekkumpurath et al., 2011; Fann et al., 2009).

Limitations

Several limitations of the project are worth noting. One limitation was that more allogeneic patients (n = 75) were screened than autologous (n = 26) in this project. This skewed screening of more allogeneic patients highlights a process limitation in the way the project was designed. The project consisted of screening patients for depression when they arrived for scheduled appointments. The autologous stem cell transplant patients that were transferred back to their primary oncologist after transplant for monitoring and maintenance chemotherapy were not screened for depression under this system. This screening practice also would not have captured allogeneic patients that did not show, were hospitalized, had passed away, or rescheduled were not screened with the PHQ tool. Patients were not captured in the data collection could theoretically have higher rates of depression leading to more frequent hospitalizations, higher mortality, lack of adherence to treatment plans hence missed or canceled appointments. Depression is known to reduce patient’s adherence to treatment regimens and increase mortality (Jim et al., 2016). In addition, the implementation period of this new screening

process was relatively short (30 days) and only had one plan-do-study-act cycle. A longer implementation period with repeated quality improvement cycles may have screened more patients and potentially identified more patients with positive PHQ-2 and PHQ-9 scores.

Recommendations for Practice

There are several recommendations to make from this QI project. The first recommendation is to make PHQ scoring results more accessible to healthcare providers. They are currently either looking up the score under the document flowsheet or getting a verbal report from the medical assistant. This reporting process has potential for errors in reporting. The Epic EHR software is capable of automatically populating PHQ scores to the providers' screen in their treatment plan as a pop up called "a best practice advisory". The BMT clinic does not currently have this function selected for the healthcare providers. The Project Director investigated adding this function to the providers preferences and the Operations Analysist (computer specialist for BMT) is making this change in August 2019.

The second recommendation is to automatically screen patients with the PHQ-2 and the PHQ-9 through the MyChart patient chart interface. Perhaps in the future, MyChart could notify patients when screenings are needed, send them the questionnaire electronically, and then patients could complete the screenings on MyChart. The screening results could be sent to a providers in-basket if follow-up is required. Previous studies have shown that patients can complete the PHQ-9 on a touchscreen themselves on average in 2 minutes (Fann et al., 2009). The benefit would be to reduce the time required to room patients and to capture patients without provider visits.

The third recommendation is to further investigate the relationship between depression and stem cell transplant. Limited research has been done to see if treating depression effectively

in transplant patients would lower mortality, hospitalizations, and increase adherence to treatment. It is not clear if there is a preferred method of mental health treatment or preferred antidepressant more effective for stem cell transplant patients with depression. More research should be done on if any prevention measures implemented before transplant could limit the adverse outcomes of depression.

Conclusion

Depression is a serious and often untreated complication of stem cell transplant. This QI project aimed to implement a new screening process for depression using the PHQ-2 and the PHQ-9 in the BMT clinic of the KUCC. The results of this QI project showed that it was effective to use a standardized PHQ tool to screen transplant patients for depression. Implementing this screening process helped detect depression in four new patients. The PHQ-9 scores were critical for the reassessment of existing depression in four patients with existing depression and positive PHQ-9 scores. The PHQ tool seems suitable as a depression screening device in our patient population at BMT clinic of KUCC with very positive feedback from MAs.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Artherholt, S.B., Hong, F., Berry, D.L., & Fann, J.R. (2014). Risk factors for depression in patients undergoing hematopoietic cell transplantation. *Biology Blood Marrow Transplant, 20*, 946-950.

Battiwalla, M., Tichelli, A., & Majhail, N.S. (2016). Long-term survivorship after hematopoietic cell transplantation: Roadmap for research and care. *Biology of Blood and Marrow Transplantation, 23*, 184-192.

Beauvais, J., Martino, S., Walker, J.S., Roback, H.B., & Welch, L. (2019) Psychological assessment. In M.H. Ebert, J.F. Leckman, I.L. Petrakis (Eds.). *Current Diagnosis & Treatment: Psychiatry*, New York, NY: McGraw-Hill.

Bjelland, I., Dahl, A.A., Tangen Haug, T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research, 52*(2), 69-77.

Braamse, A.M.J., van Meijel, B., Visser, O.J., Boenink, A.D., Cuijpers, P., Eeltink, C.E., …Dekker, J. (2015). A randomized clinical trial on the effectiveness of an intervention to treat psychological distress and improve quality of life after autologous stem cell transplantation. *Annals of Hematology, 95*, 105-114. doi: 10.1007/s00277-015-2509-6

Chhabria, K.S., & Carnaby, G.D. (2017). Psychometric validation of the Center of Epidemiological Studies Depressions Scale in head and neck cancer patients. *Oral Oncology, 75*, 158-162, doi: 10.1016/j.oraloncology.2017.11.010

Center for Innovative Public Health Research (2019). *CESD-R: The center for epidemiological studies depression scale revised*. Retrieved from http://cesd-r.com/about-cesdr/

Colligan, E.M., Cross-Barnet, C., Lloyd, J.T., & McNeely, J. (2018). Barriers and facilitators to depression screening in older adults: a quality study. *Aging & Mental Health*. doi:10.1080/13607863.2018.1531376

Cooke, L., Gemmill, R., Kravits, K., & Grant, M. (2009). Psychological consequences of hematopoietic stem cell transplant. *Seminars in Oncology Nursing, 25*, 139-150.

El-Jawahri, A.R., Traeger, L.N., Kuzmuk, K., Eusebio, J.R., Vandusen, H.B., Shin, J.A., … Temel, J.S. (2014). Quality of life and mood of patients and family caregivers during hospitalization for hematopoietic stem cell transplantation. *Cancer, 121*, 951-959. doi: 10.1002/cncr.29149

El-Jawahri, A.R., Vandusen, H., Traeger, L., Fishbein, J.N., Keenan, T., Gallagher, E.R., …Temel, J.S. (2016). Quality of life and mood predicts post-traumatic stress disorder after hematopoietic stem cell transplantation. *Cancer, 122*, 806-812, doi: 10.1002/cncer.29818

Fann, J.R., Berry, D.L., Wolpin, S., Austin-Seymour, M., Bush, N., Halpenny, B., …McCorkle, R. (2009). Depression screening using the patient health questionnaire-9 administered on a touch screen computer. *Psycho-Oncology, 18*, 14-22. doi: 10.1002/pon.1368

Ghazikhanian, S.E., Dorfman, C.S., Somers, T.J., O'Sullivan, M.L., Fisher, H.M., Edmond, S.N., …Shelby, R.A. (2017). Cognitive problems following hematopoietic stem cell transplant: Relationships with sleep, depression and fatigue. *Bone Marrow Transplantation, 52*, 279-284. doi: 10.1038/bmt.2016.248

Hartung, T.J., Brahler, E., Faller, H., Harter, M., Hinz, A., Johansen, C., …Mehnert, A. (2017). The risk of being depressed is significantly higher in cancer patients than in the general population: Prevalence and severity of depressive symptoms across major cancer types. *European Journal of Cancer, 72*, 46-53

Hinz, A., Mehnert, A., Kocalevent, R.D., Brahler, E., Forkmann, T., Singer, S., & Schulte, T. (2016). Assessment of depression severity with the PHQ-9 in cancer patients and in the general population. *BioMed Central Psychiatry, 16*(22), 1-8. doi: 10.1186/s12888-016-0728-6

Jim, H.S.L., Sutton, S.K., Jacobsen, P.B., Martin, P.J., Flowers, M.E., & Lee, S.J. (2016). Risk factors for depression and fatigue among survivors of hematopoietic cell transplantation. *Cancer, 122*, 1290-1297. doi: 10.1002/cncr.29877

Kroenke, K., Spitzer, R.L., & Williams, J.B. (2003). The patient health questionnaire-2: Validity of a two-item depression screener. *Medical Care, 41*, 1284-1292.

McQuellon, R.P., Russell, G.B., Cella, D.F., Craven, B.L., Brady, M., Bonomi, A., & Hurd, D.D. (1997). Quality of life measurement in bone marrow transplantation: Development of the Functional Assessment of Cancer Therapy-Bone Marrow Transplant (FACT-BMT) scale. *Bone Marrow Transplantation, 19*, 357-368.

Mumby, P.B., Hurley, C., Samsi, M., Thilges, S., Parthasarathy, M., & Stiff, P.J. (2012). Predictors of non-compliance in autologous hematopoietic SCT patients undergoing out-patient transplants. *Bone Marrow Transplantation, 47*, 556-561.

National Comprehensive Cancer Network. (2016). *NCCN Distress Thermometer and Problem List.* Retrieved from

https://www.nccn.org/patients/resources/life_with_cancer/pdf/nccn_distress_thermometer.pdf

New York State Department of Health, (2016, July). *Administering the Patient Health Questionnaires 2 and 9 (PHQ 2 and 9) in Integrated Care Settings*, Retrieved from https://www.health.ny.gov/health_care/medicaid/redesign/dsrip/docs/2016-07-01_phq_2_and_9_clean.pdf

Pinquart, M., & Duberstein, P.R. (2010). Depression and cancer mortality: A meta-analysis. *Psychological Medicine, 40*, 1797-1810.

Pfizer to Offer Free Public Access to Mental Health Assessment Tools to Improve Diagnosis and Patient Care (2010). *Cision Press Release Newswire*, Retrieved December 5, 2017 from https://www.prnewswire.com/news-releases/pfizer-to-offer-free-public-access-to-mental-health-assessment-tools-to-improve-diagnosis-and-patient-care-99025129.html

Pfizer Inc, (1999). *Stable resource toolkit*, retrieved from http://www.agencymeddirectors.wa.gov/files/AssessmentTools/14-PHQ-9%20overview.pdf

Satin, J.R., Linden, W., & Phillips, M.J. (2009). Depression as a predictor of disease progression and mortality in cancer patients. *Cancer, 115*, 5349-5361. doi: 10.1002/cncr.24561

Siu, A. (2016). Screening for depression in Adults: US Preventive Services Task Force recommendation statement. *The Journal of the American Medical Association, 315*, 380-387. doi: 10.1001/jama.2015.18392

Smith, H.R. (2015). Depression in cancer patients: Pathogenesis, implications, and treatment (review). *Oncology Letters, 9*, 1509-1514. doi: 10.3892/ol.2015.2944

Tecchio, C., Bonetto, C., Bertani, M., Cristofalo, D., Lasalvia, A., Nichele, I., … Pizzolo, G. (2013). Predictors of anxiety and depression in hematopoietic stem cell transplant patients during protective isolation. *Psycho-Oncology, 22,* 1790-1797. doi: 10.1002/pon.3215

Thekkumpurath, P., Walker, J., Butcher, I., Hodges, L, Kleiboer, A., O'Connor, M., … Sharpe, M. (2011). Screening for major depression in cancer outpatients: the diagnostic accuracy of the 9-item patient health questionnaire. *Cancer, 117,* 218-27. doi: 10.1002/cncr.25514

Tichelli, A., Labopin, M., Rovo, A., Badoglio, M., Arat, M., van Lint, M.T., … Socie, G. (2013). Increase of suicide and accidental death after hematopoietic stem cell transplantation: A cohort study on behalf of the late effects working party of the European group for blood and marrow transplantation (EBMT). *Cancer, 119,* 2012-21. doi: 10.1002/cncr.27987

United States Department of Health and Human Services, Agency for Healthcare Research and Quality. (2008). *AHRQ Health Care Innovations Exchange: Innovations and Tools to improve Quality and Reduce Disparities*. Rockville, MD. Retrieved from https://innovations.ahrq.gov/qualitytools/plan-do-study-act-pdsa-cycle

U.S. Preventive Service Task Force (USPSTF). (2016). Final recommendation statement: Depression in children and adolescents: Screening. Retrieved from https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/depression-in-children-and-adolescents-screening1

Wagner, L.I., Pugh, S.L., Small, W., Kirshner, J., Sidhu, K., Bury, M.J., …Watkins Bruner, D. (2017). Screening for depression in cancer patients receiving radiotherapy: Feasibility and identification of effective tools in the NRG Oncology RTOG 0841 trial. *Cancer, 123*, 485-493. doi: 10.1002/cncr.29969

Ward, M.C., & Garlow, S. (2019). Mood and Anxiety Disorders. In S.C. McKean, J.J. Ross, D.D. Dresseler, D.B. Scheurer (Eds.), *Principles and Practice of Hospital Medicine*. New York, NY: McGraw-Hill.

Vaezi, M., Gharib, C., Souri, M., & Ghavamzadeh, A. (2015). Late complications in acute Leukemia patients following HSCT: A single center experience. *International Journal of Hematology-Oncology and Stem Cell Research, 10*, 1-6.

Appendix A:

Diagnostic Criteria for Major Depressive Disorder and Depressive Episode

Diagnostic Criteria for Major Depressive Disorder and Depressive Episodes

DSM-IV Criteria for Major Depressive Disorder (MDD)

- Depressed mood or a loss of interest or pleasure in daily activities for more than two weeks.
- Mood represents a change from the person's baseline.
- Impaired function: social, occupational, educational.
- Specific symptoms, at least 5 of these 9, present nearly every day:
    1. **Depressed mood or irritable** most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful).
    2. **Decreased interest or pleasure** in most activities, most of each day
    3. **Significant weight change (5%) or change in appetite**
    4. **Change in sleep**: Insomnia or hypersomnia
    5. **Change in activity**: Psychomotor agitation or retardation
    6. **Fatigue or loss of energy**
    7. **Guilt/worthlessness:** Feelings of worthlessness or excessive or inappropriate guilt
    8. **Concentration**: diminished ability to think or concentrate, or more indecisiveness
    9. **Suicidality:** Thoughts of death or suicide, or has suicide plan

DSM – V proposed (not yet adopted) anxiety symptoms that may indicate depression: irrational worry, preoccupation with unpleasant worries, trouble relaxing, feeling tense, fear that something awful might happen.

Note: City of Palo Alto, (2019). *Project Safety Net's Diagnostic Criteria for Major Depressive Disorder and Depressive Episodes*, retrieved from: https://www.psnpaloalto.com/wp/wp-content/uploads/2010/12/Depression-Diagnostic-Criteria-and-Severity-Rating.pdf

Appendix B:

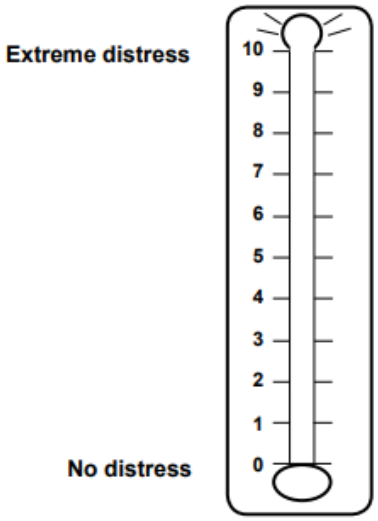
The NCCN's Distress Thermometer Scale

National Comprehensive Cancer Network®

NCCN Distress Thermometer and Problem List for Patients

NCCN DISTRESS THERMOMETER

Instructions: Please circle the number (0–10) that best describes how much distress you have been experiencing in the past week including today.



PROBLEM LIST
Please indicate if any of the following has been a problem for you in the past week including today.
Be sure to check YES or NO for each.

YES	NO	Practical Problems
❑	❑	Child care
❑	❑	Housing
❑	❑	Insurance/financial
❑	❑	Transportation
❑	❑	Work/school
❑	❑	Treatment decisions

YES	NO	Family Problems
❑	❑	Dealing with children
❑	❑	Dealing with partner
❑	❑	Ability to have children
❑	❑	Family health issues

YES	NO	Emotional Problems
❑	❑	Depression
❑	❑	Fears
❑	❑	Nervousness
❑	❑	Sadness
❑	❑	Worry
❑	❑	Loss of interest in usual activities
❑	❑	Spiritual/religious concerns

YES	NO	Physical Problems
❑	❑	Appearance
❑	❑	Bathing/dressing
❑	❑	Breathing
❑	❑	Changes in urination
❑	❑	Constipation
❑	❑	Diarrhea
❑	❑	Eating
❑	❑	Fatigue
❑	❑	Feeling swollen
❑	❑	Fevers
❑	❑	Getting around
❑	❑	Indigestion
❑	❑	Memory/concentration
❑	❑	Mouth sores
❑	❑	Nausea
❑	❑	Nose dry/congested
❑	❑	Pain
❑	❑	Sexual
❑	❑	Skin dry/itchy
❑	❑	Sleep
❑	❑	Substance use
❑	❑	Tingling in hands/feet

Other Problems: _____

_____

Note: National Comprehensive Cancer Network, (2018). *NCCN Distress Thermometer and Problem List for Patients*, retrieved from https://www.nccn.org/patients/resources/life_with_cancer/pdf/nccn_distress_thermometer.pdf

Appendix C:

Patient Health Questionnaire (PHQ) - 2

PHQ-2 Screening Instrument for Depression

Over the past two weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3

Scoring: A score of 3 or more is considered a positive result. The PHQ-9 (Table 3) or a clinical interview should be completed for patients who screen positive.

PHQ = Patient Health Questionnaire.

Note: Pfizer Inc, (2019). *Patient Health Questionnaire (PHQ) screeners*. Retrieved from http://www.phqscreeners.com

Appendix D:

Patient Health Questionnaire (PHQ) - 9

The Patient Health Questionnaire (PHQ-9)

Patient Name _____ Date of Visit _____

Over the past 2 weeks, how often have you been bothered by any of the following problems?	Not At all	Several Days	More Than Half the 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 asleep, 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're 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 in some way	0	1	2	3
Column Totals		_____ +	_____ +	_____
Add Totals Together		_____		

Note: Pfizer Inc, (1999). *Stable resource toolkit*, retrieved from http://www.agencymeddirectors.wa.gov/files/AssessmentTools/14-PHQ-9%20overview.pdf

Appendix E:

Patient Health Questionnaire (PHQ)-9 Scoring System and Diagnosis Guide

PHQ-9 Score	Depression Severity	Proposed Treatment Actions
0 – 4	None-minimal	None
5 – 9	Mild	Watchful waiting; repeat PHQ-9 at follow-up
10 – 14	Moderate	Treatment plan, considering counseling, follow-up and/or pharmacotherapy
15 – 19	Moderately Severe	Active treatment with pharmacotherapy and/or psychotherapy
20 – 27	Severe	Immediate initiation of pharmacotherapy and, if severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management

Note: PsychCongress.com, (2019). *Instruction Manual: Instructions for Patient Health Questionnaire (PHQ) and GAD-7 Measures*, retrieved from https://www.pcpcc.org/sites/default/files/resources/instructions.pdf

Appendix F:

Letter of Support from Clinic Leadership

March 25, 2019

Blood and Marrow Transplant Clinic Leadership
University of Kansas Health System
2650 Shawnee Mission Parkway,
Westwood, KS 66205

To whom it may concern:

We are signing below to show our support for the DNP project of student, Margaret Foss, to standardize PHQ-2 and PHQ-9 depression screenings in the post-transplant outpatient population. The project would implement depression screening in this high-risk population. The project would have medical assistants assess PHQ-2 questions while rooming patients and if the score was positive, have them complete PHQ-9 questions. The proposed project is feasible and could improve the quality of patient care at our clinic.

Sincerely,

Erin Winters
Department Manager

Caroline Strohm
Exam Manager

Ashley Lord
Unit Educator

Leslie Meador
Treatment Manager

Appendix G:

Medical Assistant Post Implementation Survey

Thank you for your assistance in implementing the new screening process for depression among post stem cell transplant patients. The purpose of this survey is to obtain your feedback regarding the implantation of this new process.

1. Did the PHQ-2 and PHQ-9 surveys take you less than 3 minutes to complete on average?
    a. -Yes
    b. -No
2. Were most patients willing to answer the PHQ questions for you?
    a. -Yes
    b. -No
3. Would you be willing to continue this screening process?
    a. -Yes
    b. -No
4. Additional Comments:

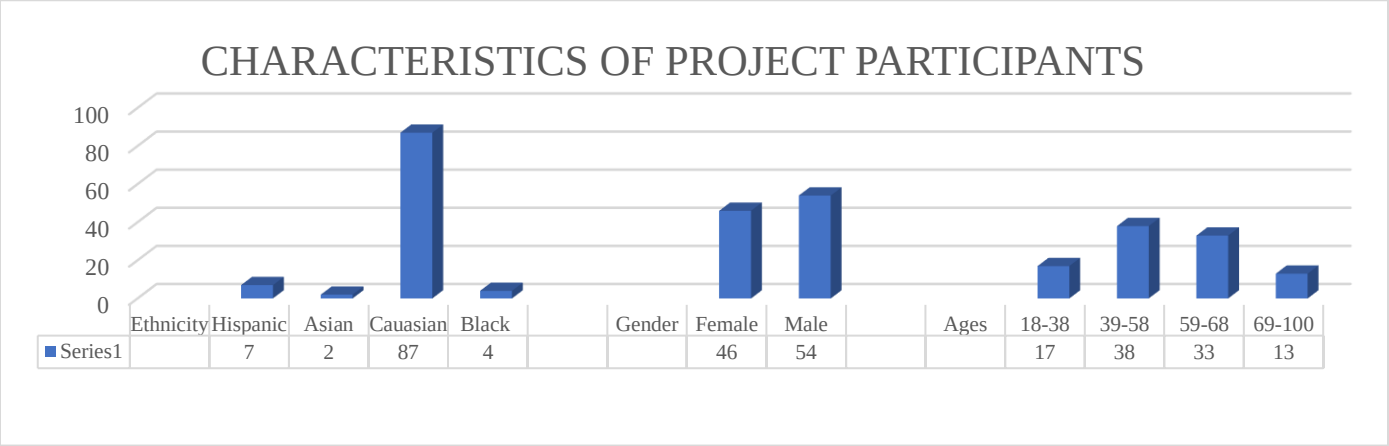
Appendix H:

Data Collection Spreadsheet

Subject	Age	Gender	Ethnicity	Transplant Type	Visit date	PHQ-2 score	PHQ-9 score	PHQ Declined	PHQ-9 Scoring result	Referral to Mental Health	Depression medication started	2nd Visit date	PHQ-2 score	PHQ-9 score
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

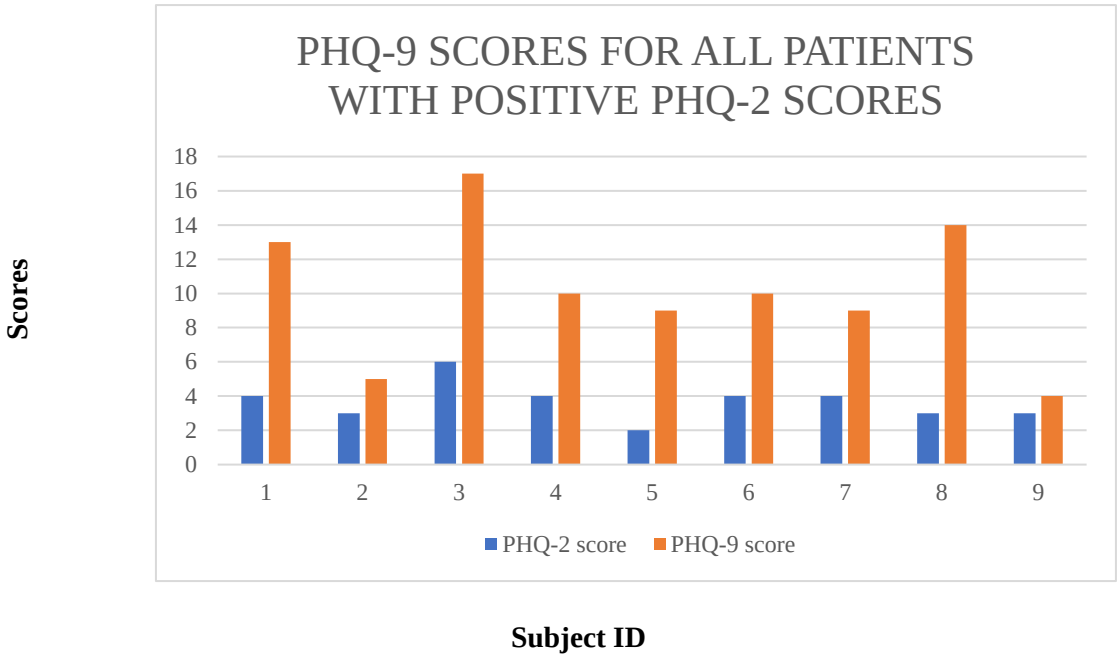
Appendix I:

Figure 1. Characteristics of Project Participants



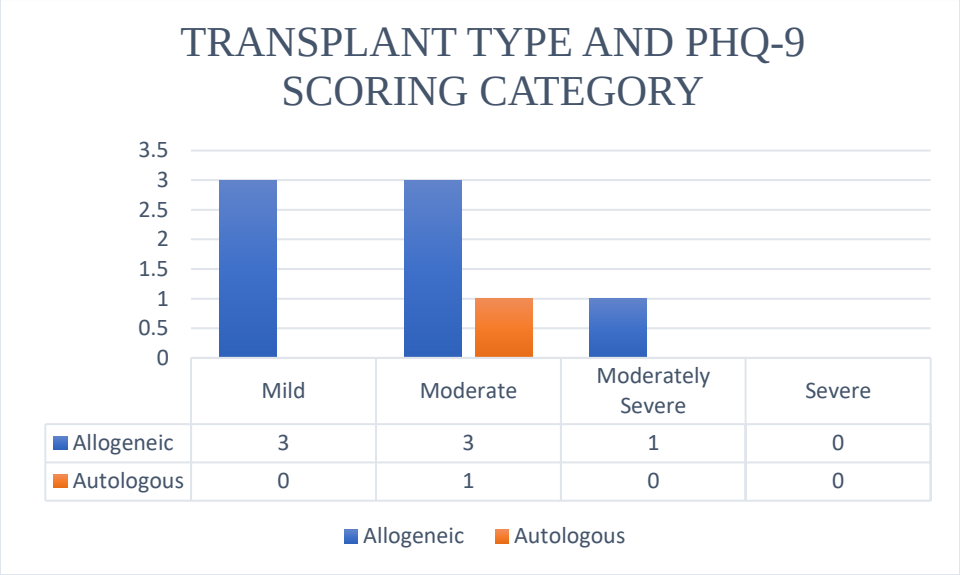
Appendix J:

Figure 2. Distribution of Positive PHQ-2 and PHQ-9 Scores



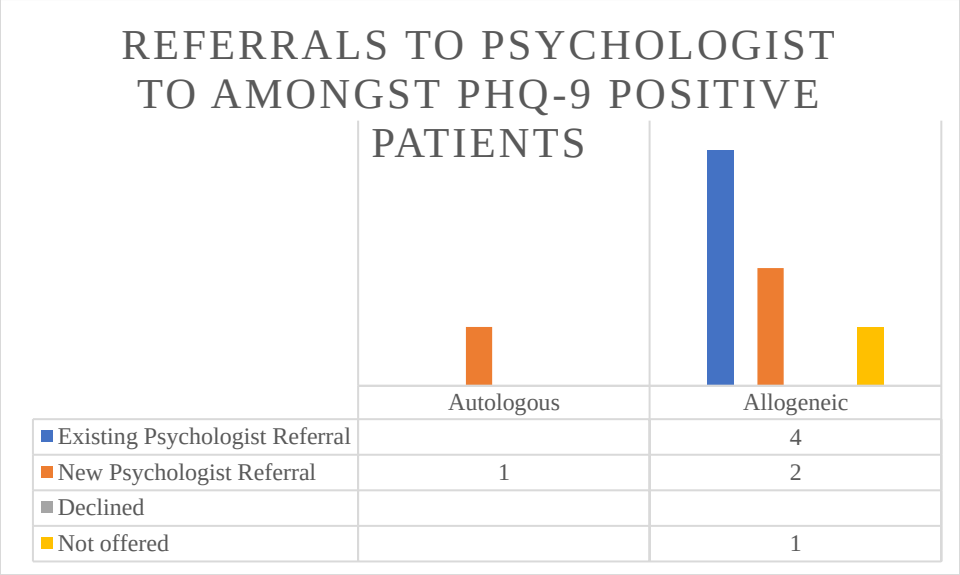
Appendix K:

Figure 3. Distribution of Depression by Severity and Transplant Type



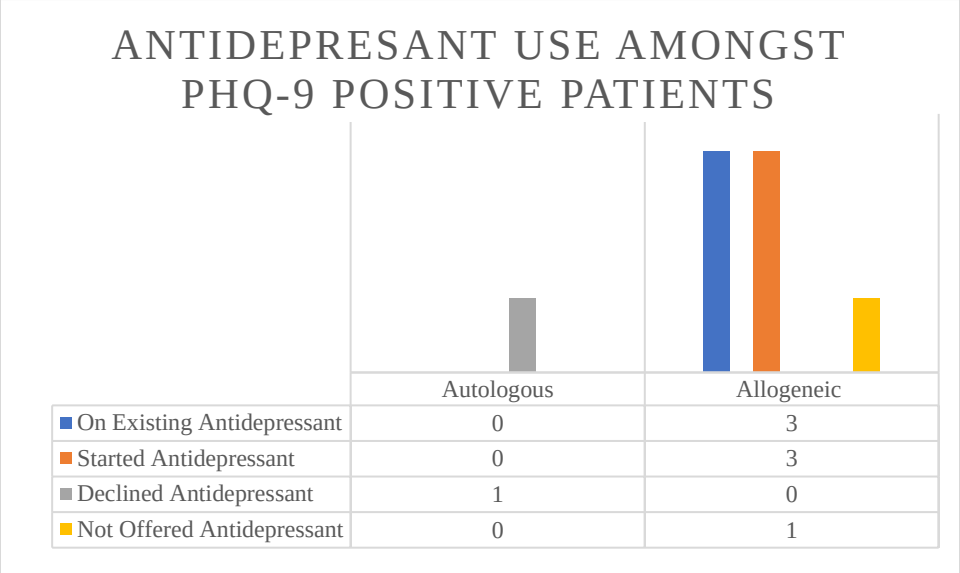
Appendix L:

Figure 4. Transplant Type and Referrals to Mental Health Specialist of PHQ-9 Positive Patients



Appendix M:

Figure 5. Transplant Type and Antidepressant Prescriptions amongst PHQ-9 Positive Patients



	Autologous	Allogeneic
On Existing Antidepressant	0	3
Started Antidepressant	0	3
Declined Antidepressant	1	0
Not Offered Antidepressant	0	1

Appendix N:

Figure 6. Medical Assistant Survey Results Question Results