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Improving Mental Health Outcomes for Amputees

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Advisory Committee

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Abstract

Problem: depression, anxiety, and other mental health disorders are more commonly diagnosed in the amputee population related to changes in mobility, activities of daily living, and quality of life (Turner et al., 2020.) As the amputation population is projected to reach over 3 million Americans in the next 25 years, additional screening is imperative to identify patients at high-risk for mental health deterioration (Ziegler-Graham et al., 2018).

Methods: this was a project that included screening all patients with the Personal Health Questionnaire for Depression (PHQ-8) meeting the inclusion criteria of being admitted to 7500 Vascular Surgery at Barnes-Jewish Hospital with an amputation within 24 hours of their procedure. Patients were identified according to their results as mild, moderate, high, or severe, and referred to appropriate treatment, as applicable.

Results: a total of 31 patients (N = 31) were included in this project, 16 male and 15 female. On the PHQ-8, a total of 21 patients scored mild, eight scored moderate, and two scored severe. The average PHQ-8 score amongst the sample was 4.10 (SD = 2.92). The referral to treatment rate was 6.4% (n = 2) and included advanced practice provider assessment and social work referral. The independent variables of age, race, gender, and previous mental health history were not predictors of PHQ-8 risk. The type of procedure completed correlated with PHQ-8 risk score, but the results are subject to statistical error related to sample size.

Implications for practice: findings support all patients where amputation is a consideration need structured, comprehensive, and targeted depression risk screening throughout their evaluation and recovery to identify potential mental health decline.

Improving Mental Health Outcomes for Amputees

Amputation is a common medical procedure conducted both emergently and routinely for thousands of patients each year. Common diagnoses requiring amputation include diabetes, infection, peripheral vascular disease, and traumatic injury. Nearly 200,000 amputations are performed each year in the United States, and in 25 years, the amputee population is anticipated to reach over 3 million due to the aging diabetic and peripheral vascular disease populations (Ziegler-Graham et al., 2018). Although the occurrence and frequency of amputation is common, the effects of amputations on one's mental health and psychological well-being can often be overlooked, as amputations are frequently conducted abruptly and the management of other comorbid conditions in preparation for the surgery can cloud the importance of mental health screening and optimization (Jo et al., 2021). Adverse mental health outcomes can be prevented and treated in the amputee population through comprehensive, targeted screening in the pre-operative and post-operative phases, as well as follow-up appointments inclusive of therapy, pharmaceutical, and other interventions (Del Piero et al., 2020).

Depression, anxiety, and other depressive and mental health disorders are more commonly diagnosed in the amputee population, with the highest occurrence of new mental health diagnoses being within the first two years following amputation (Ziegler-Graham et al., 2018). Changes in mobility, activities of daily living, perceived codependence, quality of life, and inadequate social and family support are contributing factors to mental health deterioration in the amputee population post-operatively (Turner et al., 2020). A study conducted by Cohen-Tanugi et al. (2022) indicated over 50% of post-amputation patients screened positive for depression in the first six months

following their procedure. Major depressive disorder is the most common mental health disorder in the United States with over 17 million people diagnosed and is the strongest risk factor for suicidal behavior (National Institute of Mental Health, 2021).

The purpose of the project is to institute timely and efficient screening and surveillance of depression for patients that have received a limb amputation procedure. With the use of evidence-based screening tools focused on patients in the post-operative phase of amputation, the risk for major depressive disorder can be evaluated based on known risk factors, such as familial support, quality of life, and activities of daily living. High risk patients identified through the screening will receive targeted therapies and interventions from members of the multidisciplinary team, such as social work and psychiatric medicine, to prepare for their life following the procedure. The overarching purpose of this project is to improve the mental health outcomes of amputees in the post-operative phase.

The Johns Hopkins model was the evidence-based practice model used to guide this project. The Johns Hopkins models is a common and effective evidence-based practice model that focuses on a three-step process of practice question, evidence, and translation. The model allows for change and practice to be influenced and edited quickly and effectively through use of the latest research and clinical recommendations into the clinical area for better patient outcomes (Dang et al., 2022).

The aim of this project was to screen all patients who have undergone amputation for risk of major depressive disorder prior to discharge and enhance awareness and increase education to mental health conditions surrounding amputation in the post-operative phase. The primary outcome measure was participants' responses to the Personal Health

Questionnaire Depression Scale (PHQ-8) and their subsequent depressive distress score

(Kroenke et al., 2009). The secondary outcome measure of interest was the type of

treatment (if applicable) the patient received following their PHQ-8 screening

assessment. The study question for this project was "in patients who have undergone

amputation in an acute care hospital, how does targeted major depressive disorder

screening and interventions impact their mental health outcomes related to amputation

recovery?"

Review of Literature

To complete the literature search on this topic, PubMed, CINAHL, and EBSCOhost

were used. Key search terms and phrases included *mental health, depression, behavioral*

health, psychiatric, amputation, amputee, limb loss, risk, screening, intervention, pre-

operative, peri-operative, post-operative, diagnosis, limb, arm, leg, upper extremity, and

lower extremity. Boolean operators "AND" along with "OR" were generated within the

literature search to capture potential articles. Initially, thousands of results were produced

based on the key search terms and phrases. Inclusion criteria were then installed, which

involved studies from 2018 to 2023, published in the English language, geographically

located in North America, and search terms in title or subject terms. Publications selected

were from the past five-years to ensure the most recent evidence and current findings.

Articles published before 2018 and involving pediatric patients (patients 17 or younger)

were excluded from the literature search. After the inclusion and exclusion criteria were

applied, 109 total articles were generated, and 12 articles were selected for the literature

review.

Although the occurrence and frequency of amputation is common in the United States and across the world, with thousands of amputations conducted annually, the effects of amputations on one's mental health and psychological well-being can often be overlooked (Ziegler-Graham et al., 2018). In fact, according to Arya et al. (2018), comorbidly depressed patients with peripheral vascular disease or diabetes had a higher risk of amputation and mortality than those without depression, indicating depressive symptoms are not only seen in the population before the procedure, but also put the patient at higher risk for mortality following the amputation.

Untreated depression was the single highest risk factor for amputations and death ($p < 0.05$) in the over 150,000 patients retrospectively observed (Arya et al., 2018). Strengths of the Arya et al. (2018) study included a large sample size and a diverse group of participants allowing for a multitude of data collection and information. However, the study was limited by the observational nature and lack of other therapies and interventions being accounted for in the sample (Arya et al., 2018). Similarly, patients examined by Rahim et al. (2022) in a prospective observational study also revealed high rates of depressive disorders and anxiety in lower extremity amputees, contributing to increased rates of psychological morbidity and overall mortality for amputees ($p < 0.05$). Unfortunately, the study included a predominantly male sample size and was limited to a single patient ward. It was also limited by prospective observational methods for a period of 6-months allowing for variance and bias within the sample. Furthermore, a quantitative cross-sectional self-reported survey study conducted at six large prosthetic rehabilitation facilities in Texas by Armstrong et al. (2019) indicated a strong correlation associated with depression in the amputee population ($p < 0.0001$). Over half of the respondents

screened positive for exhibiting depressive symptoms. The study indicates an association

of amputation and depression, and indicated females and people of ethnic minorities were

more vulnerable to psychological distress and decline in the post-operative stage ($p <$

0.0001). High levels of low activity and reported levels of uncomfortable or intolerable

pain also indicated a higher risk of depression (Armstrong et al., 2019). All three studies

(Arya et al., 2018; Rahim et al., 2022; Armstrong et al., 2019), however, indicated a

reliable and apparent correlation between depressive symptoms, amputation, and

morbidity and mortality (Arya et al., 2018; Rahim et al., 2022; Armstrong et al., 2019).

Patients that have received an amputation, an intensive and life-altering procedure, are at

higher risk of psychological diagnoses and overall mortality. Therefore, amputees require

comprehensive psychological therapies and interventions to improve their health

outcomes and adjust to life as an amputee. Targeted screening, psychiatric evaluation,

and mental health counseling is critical to enhance and maximize the quality of life and

reduce morbidity and mortality for patients living with amputations (Arya et al., 2018;

Rahim et al., 2022; Armstrong et al., 2019).

Amputation can be stratified to two different scenarios—planned amputations and

emergent amputations. Emergent amputations are conducted with little to no preparation

and usually performed because of acute trauma or illness. Given the rapid nature and

accelerated sequence of events, minimal evidence exists of patients and their psyche prior

to amputation. Planned amputations, the more common route, are frequently completed in

patients with pre-existing medical conditions such as diabetes and peripheral vascular

disease (Kalbaugh et al., 2020).

To further portray the importance of psychological surveillance in amputees, pre-operative evidence was identified in the literature review. A study conducted by Ramirez et al. (2020) resulted in association of depression with increased post-operative complications in patients with peripheral artery disease and limb ischemia, leading to a high risk of major amputation and elevated mortality compared to those without depression. In addition, patients with diagnosed depression in the pre-operative stage experienced a longer length of stay, on average an additional one to two days ($p < 0.001$), and more complications with rehabilitation placement upon discharge (Ramirez et al., 2020). This study of 5,472 cases indicates the need for and importance of pre-operative mental health screening and treatment to minimize difficulties and maximize quality of life and outcomes following the procedure. Furthermore, in a retrospective analysis of nearly 3,000 patients with chronic limb-threatening ischemia conducted by Zielke et al. (2023), comorbid depression was present in 212 patients, and represented a nearly 70% increase in the odds of major amputation and over 150% increase in the mortality of these patients. The severe increase in mortality was associated with patients in the study who were not prescribed antidepressants, whereas those prescribed medication had a six percent increase in mortality. It is evident the importance of depressive treatment for patients with diabetes, peripheral artery disease, limb ischemia, and other conditions at high risk for amputation. Without intervention and treatment, comorbid depression severely enhances the risk of major amputation and mortality.

Post-operative studies focused on outcomes and patient health following amputation also indicate support of psychological decompensation amongst affected individuals. A majority of the sample in Pereira et al.'s (2018) study indicated dissatisfaction with life

following amputation, revealing difficulty adjusting to their new reality related to lack of positive psychosocial environments and interventions to assist in coping and adjustment. The data suggests meaningful and targeted psychosocial and coping strategies improve psychiatric outcomes in amputees ($p < 0.05$) but the study is limited by the sample size and inclusion of numerous types of amputees, including more minor toe amputations within the sample (Pereira et al., 2018). In addition, post-surgical surveys conducted at several points in amputation recovery suggested a high rate of depressive symptoms post-operatively ($p < 0.05$), with the most severe depressive symptoms associated with severe pain, poor state of health, and a history of mental health disorders in the amputee population (Roepke et al., 2019). The evidence of the Roepke et al. (2019) study suggests management of pain, depression, and comorbidities was imperative to the overall health post-procedure, but the study was limited by missing data from those that withdrew or expired during the survey window. Furthermore, several risk factors exist and are present in patients undergoing amputation, putting them more at risk for severe depression and post-traumatic stress disorder post-operatively. Risk factors include age, coping mechanisms, and psychological preparation for their life after amputation (Yun et al., 2021). To thwart existing risk factors and maximize patient outcomes, a multidisciplinary mental health approach to assist the patient in moralizing life after surgery will improve outcomes. The systematic review conducted by Yun et al. (2021) is well researched and supported by peer review, gathering the latest evidence and recommendations, but there is limited evidence available on the true effectiveness of psychological interventions in the amputee population, as many confounding variables exist.

Clinical recommendations and clinical practice guidelines are well distributed and researched amongst the medical management of amputees related to psychiatric and other domains of overall health. In the Veterans Affairs setting, current guidance indicates behavioral health assessment and psychosocial functioning optimization throughout all stages of amputation—preoperative, perioperative, and post-operative (Department of Veteran Affairs, 2017). The potential benefits of these therapies on a patient's recovery and health far outweigh potential harm, as psychiatric conditions are already diagnosed at heightened rates amongst the veteran population (Department of Veteran Affairs, 2017). In addition, the use of a multidisciplinary comprehensive team of healthcare professionals is paramount for the health and success of patients undergoing amputation, according to Keszler et al. (2020). Within such a team exists psychoneurological intervention and mental health experts to assist the patient in adjusting to their lifestyle change and promoting functional independence. These two systematic reviews are well-researched and validated by clinical experts and present the most recent information on the topic. Both clinical recommendations support the focus of psychiatric screening, interventions, and counseling to better assist in an amputee's new life following surgery.

In summary, amputees are a vulnerable population related to morbidity, mortality, and psychiatric well-being. Despite high prevalence of psychiatric decline, amputees can prevent and display resilience against psychiatric issues through medical professional assistance following their operation (Roepke et al., 2019). This includes early and comprehensive screening, intervention, therapy, counseling, support, and medications. These steps and treatment regimens should be implemented in all stages of amputation and supported by a multidisciplinary team. While research is limited in the amputee

population related to samples and qualitative data, the literature available strongly

supports patients that received psychiatric-focused treatment and interventions are more

likely to experience favorable outcomes, a better quality of life, and decreased mortality

compared to those who do not (Yun et al., 2021). Amputees should be screened for

psychiatric decline risk and provided with comprehensive psychiatric and mental health

resources to optimize their life after amputation.

Method

Design

The approach to this project was quality improvement. The quality improvement

project design included a cohort sample of patients that have undergone limb amputation.

Setting

The setting of the project was the acute inpatient setting at Barnes-Jewish

Hospital, specifically on the 7500 Vascular Surgery Stepdown unit. The patient

population of the setting was adult patients that have undergone an amputation procedure

and admitted to the division post-operatively. Barnes-Jewish Hospital is the flagship

medical facility of BJC Healthcare, which operates 13 hospitals across the St. Louis

metropolitan area. Barnes-Jewish Hospital houses over 1100 inpatient beds. BJC is the

largest employer in St. Louis, employing over 30,000 individuals across the region.

Sample

The sample was a convenience sample intended to capture all patients admitted

post-operatively on the inpatient unit following their amputation procedure. Recruitment

strategies included staff and patient education of the project and focus on the initiative

during daily discharge planning and treatment team rounding. Inclusion criteria consisted

of adult patients over the age of 18, admitted to 7500 Vascular Surgery Stepdown, alert

and oriented and able to consent for participation independently, and post-operative care

following an amputation procedure. Patients previously diagnosed with a mental health

condition were included in this project, as well as those without a previous mental health

disorder diagnosis. Exclusion criteria included pediatric patients under the age of 18, and

patients not alert and oriented nor able to consent themselves for participation in the

project. Desired sample size of this project was 15, but the frequency of amputation

procedures is variable. The sample resulted in 31 patients.

Intervention

The specific intervention this project centered on the administration of the

Personal Health Questionnaire Depression Scale (PHQ-8) to patients that met the

inclusion criteria within 24 hours following their procedure and upon arrival to the 7500

Vascular Surgery unit. The assessment is an eight question survey with each question

scored on a scale from 0-3. The patient's total risk score was calculated on a scale from 0

to 24, with 0-5 indicating mild risk, 6-9 moderate, 10-15 severe, and 16 or higher as

major depression (Kroenke et al., 2009). Depending on the patient's risk score, additional

provider assessment was warranted for the patient prior to discharge, and the primary

outcome measure was the PHQ-8 risk score. The secondary measures was a referral to

appropriate treatment and the type of treatment the patient received (provider assessment,

social work consult, outpatient follow up, pharmacological support, psychiatric consult,

etc.).

Data Collection

Data was de-identified and coded as non-descript letters. Each patient received an alias of a number, such as 1, 2, 3, etc., and the basic demographics of each patient were recorded, which included name, age, date of birth, gender, race, procedure completed, PHQ-8 risk score, and intervention(s) generated for each patient. Each PHQ-8 assessment received a corresponding number (1, 2, 3, etc.) matching the patient to ensure the assessment and patient match. The data collection instrument used was the PHQ-8 assessment (See Appendix A). The method to obtain data was face-to-face screening utilizing the PHQ-8 assessment, as well as retrospective medical record review. Users that gathered data included the PI and 7500 Vascular Surgery nursing leadership, including the Clinical Nurse Manager, Clinical Educator, and Assistant Nurse Managers. The training plan consisted of an overview of the project, its goals, inclusion and exclusion criteria, data collection plan, and the screening tool, including how to administer the tool, score it, and record the data. The training was conducted in a live virtual meeting and was recorded for reference. Follow up training and education was provided, as needed.

Data Analysis

This project captured interval levels of measurement with the PHQ-8 risk score, and compared them to the variables of age, gender, race, and procedure completed. Statistics analyzed included the frequency distribution, range, standard deviation, variance, mean, median, and mode of the sample's risk scores. In addition, linear and multiple regression tests were conducted to compare the sample's independent variables (age, gender, race, mental health history, type of procedure completed) to their PHQ-8

depression risk score and category. Risk score categories were identified as mild is 1,

moderate is 2, severe is 3, and major depression is 4.

Approval Process

Approvals required for this project included the University of Missouri-St. Louis

organizational doctoral committee consisting of Dr. Joshua Minks PhD, FNP-C, and Dr.

Brittania Phillips DNP, APRN, PMHNP-BC, as well as third committee member, 7500

Vascular Surgery Clinical Nurse Manager, Brooke-Marie Strout MSN, RN. The project

plan and goals were approved by representatives of Vascular Surgery and Psychiatry at

Barnes-Jewish Hospital. In addition, institutional IRB approval of Barnes-Jewish

Hospital and University of Missouri-St. Louis were obtained. Risks to this project

included stress and negative feelings from the patient related to answering direct

questions regarding their mental health and condition. Perceived benefits were mental

health screening, interventions, and surveillance to improve patient outcomes following

amputation procedure, as well as provider and staff engagement and clinical

improvement. No ethical considerations.

Results

Throughout the data collection process, a total of 31 (n=31) patients met the

inclusion criteria of the QI project. The category of gender was male (n=16, 51.6%) and

female (n=15, 48.4%). The average age of the sample was 66.29 (SD = 11.57). There

were two races observed in the sample, white (n=17, 54.8%), and African-American

(n=14, 45.2%). Of the total patients, those without a previous mental health diagnosis

was most frequently observed (n=22, 71%); the most common amputation procedure was

below-the-knee amputation (BKA) at 14 cases completed (45.2%) (See Appendix B). A

Pareto chart describing the different procedures captured in the project is included in

Appendix C.

The PHQ-8 patient depression assessment screening rate was 100% (N=31). Of

the patients screened, the average PHQ-8 score was 4.10 (SD = 2.92). The most frequent

category for depression risk was mild (n=21, 67.7%), followed by moderate (n=8,

25.8%). Two patients met the severe category (n=2, 6.4%%), as indicated in Appendix D.

No patients were included in the major depressive category. Lastly, the treatment rate

was 6.4% (n=2) and included advanced practice provider assessment and social work

referral for (n=2, 6.4%). No patients that met inclusion criteria declined or failed to

participate in the screening assessment.

A simple linear regression analysis demonstrated an insignificant relationship

between age and PHQ-8 risk score, $F(1,29) = 2.909$, $p < 0.05$, p = .099, $R^2 = .06$.

Approximately 6% of the variance in the PHQ-8 risk scores were correlated to age.

Therefore, age was not found to be a significant predictor of PHQ-8 risk score or

category ($B = .080$, $p < 0.001$) (Appendix E).

A multiple linear regression analysis was calculated to predict the relationships

among the other independent variables (gender, race, mental health history, and type of

procedure completed) related to the PHQ-8 risk score and associated category (See

Appendix F). The variables of gender, race, age, and mental health history were found

not to be significant predictors of PHQ-8 risk score. The results of the multiple regression

analysis indicated the type of procedure completed was a predictor of PHQ-8 risk score,

$F(1,29) = 6.302$, $p < 0.05$, p = .018, $R^2 = .15$. Approximately 15% of the variance in the

PHQ-8 risk scores were related to the type of procedure completed (B = -1.808, $p <$

0.001) (See Appendix G).

Discussion

The number of patients screened for this project was 31, over double the

anticipated sample size. Most patients scored in the mild risk for depression category (n =

21, 67.7%). Others scored in the moderate category (n = 8, 25.8%), and severe (n = 2,

6.4%). The independent variables of age, gender, race, and previous mental health history

were found not to be statistically significant in the dependent variables of PHQ-8 risk

score and category. The type of procedure completed, however, was found to be

statistically significant in relation to PHQ-8 risk score and category ($p < 0.001$). In this

project, the patient receiving an above-the-knee amputation (AKA) or below-the-knee

amputation (BKA) was associated with a higher PHQ-8 risk score, suggesting the

potential for mental health decline is correlated with these procedures.

Two patients in this project scored in the severe category (n = 2, 6.4%) and

received additional treatment as a result. The additional treatment included advanced

practice provider assessment and social work referral.

A Pareto chart is a quality improvement instrument used to illustrate and describe

the frequency of problems in a study question that offers the largest opportunity for

improvement or influence. With visualization of the most glaring issues, groups can be

more efficient in installing interventions to reduce or solve the problem (Minnesota

Department of Health, 2023). A Pareto chart was generated to assess the different

procedure types within this project. Data indicated BKAs (n = 14, 45.2%) were of the

most common procedure completed. These results indicate heightened attention and

focus to patients receiving a BKA for mental health and depression focused screening and assessment. Recommendations include early awareness by providers and caregivers to the potential of an amputation procedure, specifically BKAs, and installing frequent assessments of depression screening throughout the patient's medical work up related to the vascular surgery issue. Additionally, enhanced education to hospital nursing staff, patients, and their families is indicated to increase awareness to the psychiatric risks amputation procedures present to the patient.

Limitations to the project included timing and frequency of the PHQ-8 screening. The assessment was administered once within 24 hours of the procedure being completed, which could have produced unreliable results or statistical error. Results of the assessment or answers given by the patient could be influenced by inpatient experience, medication, sleep, family presence, or other factors. Recommendations include administration of the PHQ-8 at multiple steps in the patient evaluation, when possible. Suggestions include pre-operatively in a clinic or primary care setting, pre-operatively within a week of a planned surgery date, post-operatively within 24 hours, post-operatively within one month of procedure completed, and every six months up to two years post-operatively, which aligns with the literature suggesting mental health decline is most prevalent within two years of an amputation procedure (Ziegler-Graham et al., 2018).

The presence or existence of perceived social or family support, as well as marital status, work status, financial status, or other stressors were not captured in this project. A recommendation of future study is to include such factors in mental health surveillance

within the post-amputation population to account for other independent variables or

possible contributing factors.

The sample size, although larger than expected, affects the significance of the

multiple regression analysis, and should be identified as a limitation. Age, gender, and

race were found not to be correlating predictors of PHQ-8 risk scores, suggesting no

specific demographic demonstrated higher risk than others. A recommendation would be

to install routine screening for all amputation patients no matter their demographics.

Finally, the presence of previous mental health disorders or diagnosis were found

not to be a statistically significant predictor of post-amputation depression risk. However,

a limitation of this project was the inability to capture psychiatric medication adherence,

follow up appointment compliance, or perceived effectiveness of treatment within the

patients assessed. Future study considerations include further investigation of mental and

psychiatric stability and health within the amputee population.

Conclusion

Prior to the implementation of the PHQ-8 depression screening, the 7500

Vascular Surgery floor at Barnes-Jewish hospital had no provider or nurse focused

depression risk assessment for the amputee population. Since the genesis of this project,

enhanced communication and focus on mental health outcomes has been a priority of the

care team. Groups are meeting on a consistent basis to build a robust post-amputation

patient experience program which includes art therapy, music therapy, social interaction,

chaplain resources, concierge rounding, and peer support group services to help improve

this delicate patient population and their adjustment to life after amputation. Through

increased awareness of the risk amputations present to the mental well-being of the

patients under the vascular surgery medical team's care, the providers and caregivers are

better equipped to assess, identify, and intervene on possible depression risk, improving

patient outcomes and satisfaction. Future study should focus on the support mechanisms

surrounding amputation patients, examining the relationships among demographic

variables, mental health history, and PHQ-8 outcomes, as well as previous mental health

diagnoses and treatment plans.

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Appendices

Appendix A
PHQ-8 Survey

Personal Health Questionnaire Depression Scale (PHQ-8)

SMRC
Self-Management
Resource Center

Over the **last 2 weeks**, how often have you been bothered by any of the following problems? *(circle one number on each line)*

How often during the past 2 weeks were you bothered by...	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 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

Appendix B
Descriptive Statistics

Statistics

		Mental Health Hx	Procedure Completed	Gender	Race	Age
N	Valid	31	31	31	31	31
	Missing	0	0	0	0	0
Mean		1.29	1.77	1.48	1.45	66.29
Median		1.00	2.00	1.00	1.00	69.00
Std. Deviation		.461	.717	.508	.506	11.574
Range		1	2	1	1	44

Mental Health Hx

	N	%
No	22	71.0%
Yes	9	29.0%

Procedure Completed

	N	%
AKA	12	38.7%
BKA	14	45.2%
Other	5	16.1%

Gender

	N	%
Male	16	51.6%
Female	15	48.4%

Race

	N	%
White	17	54.8%
Black	14	45.2%

Appendix C
Types of Amputation Procedures Experienced by Patients (*N*=31)

Type of Amputation Procedure Completed
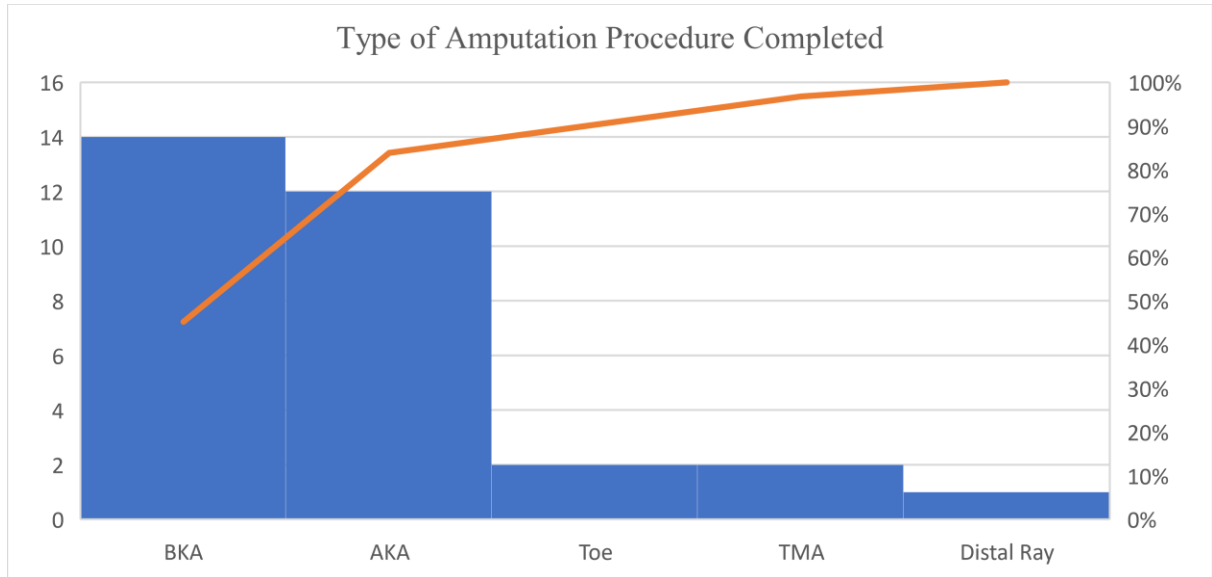
Appendix D
PHQ-8 Survey Results (*N*=31)

PHQ-8 Depression Risk Categories
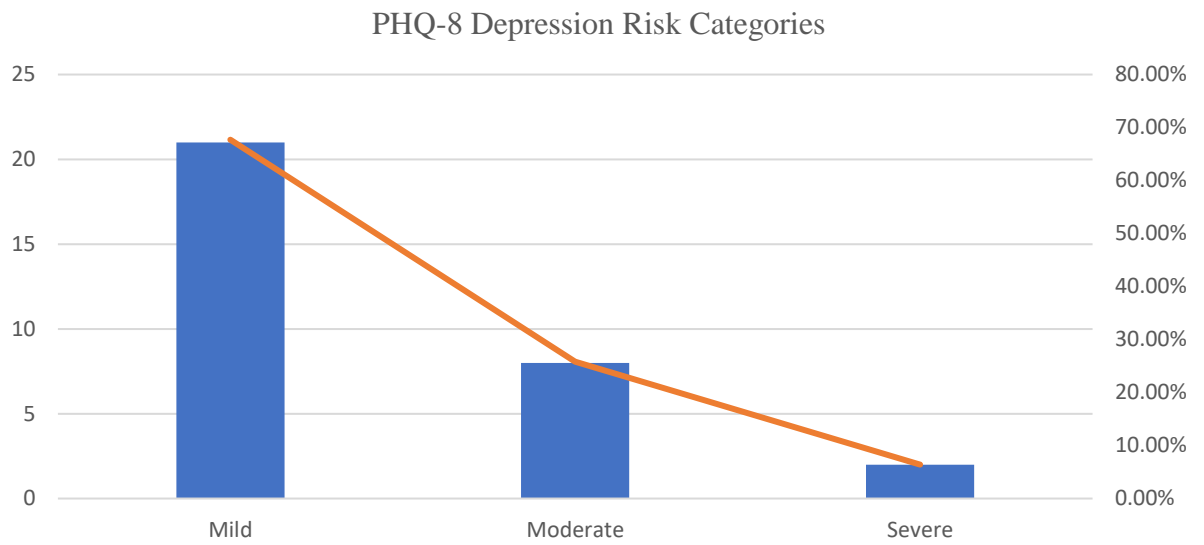
Appendix E
Multiple Regression Analysis: Age and PHQ-8

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.302[a]	.091	.060	2.974	.091	2.909	1	29	.099

a. Predictors: (Constant), Age

b. Dependent Variable: PHQ Score

Appendix F
Multiple Regression Analysis: Mental Health History, Race, and PHQ-8

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.168[a]	.028	-.080	3.187	.028	.260	3	27	.854

a. Predictors: (Constant), Mental Health Hx, Race, Gender

b. Dependent Variable: PHQ Score

Appendix G
Multiple Regression Analysis: Type of Procedure and PHQ-8

Model Summary[b]

Mod el	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.423[a]	.179	.150	2.827	.179	6.302	1	29	.018

a. Predictors: (Constant), Procedure Completed

b. Dependent Variable: PHQ Score