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Evaluating Patient Health Questionnaire-9 (PHQ-9) Use in Burn Survivors

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A Dissertation Submitted to The Graduate School of the University of Missouri-St. Louis
in partial fulfillment of the requirements for the degree Doctor of Nursing Practice with
an emphasis in Psychiatric Mental Health Nurse Practitioner

August 2022

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Abstract

Problem: A burn injury affects both psychological and physical health, resulting in a greater than 50% major depressive disorder morbidity. The purpose of this quality improvement (QI) project is to evaluate the use of the Patient Health Questionnaire-9 (PHQ-9) in adult burn survivors, with an aim to increase the use of the screening tool.

Methods: A mixed-methods pre/post-survey design with an educational component was utilized to assess nurse knowledge, confidence, willingness, and barriers to completion of the PHQ-9. Aggregate data were collected to determine PHQ-9 completion rates for patients admitted to and discharged from the unit during the two months prior and two months following the educational component.

Results: A Wilcoxon signed-rank test found statistically significant differences in median nursing pre/post survey results ranging from $z = .93$ to $z = 3.70$, $p < .05$. Question five was the only non-statically significant result with $z = 0.93$, $p = 0.93$. PHQ-9 completion rates before the educational component were 6% on admission, compared to 40% after the education component, a 33.3% increase. Completion rates were 0% at discharge initially, compared to 13% after the education, an 86.8% increase.

Implications for Practice: This QI project accomplished the aim of increasing the use of the PHQ-9 in burn survivors and simultaneously increased the nurses' knowledge, confidence, and willingness in completing the tool, as well as identifying barriers to completion as reported by the nurses.

Evaluating Patient Health Questionnaire-9 (PHQ-9) Use in Burn Survivors

The World Health Organization (WHO) approximates 11 million burn injuries occur globally each year, with approximately 180,000 of those injuries resulting in death (Jeschke et al., 2020). A burn injury is defined as an injury or destruction of the skin or other organic tissue caused by exposure to heat, radiation, electrical current, chemicals, or radioactivity. A burn injury is an acute and variable form of trauma, affecting both psychological and physical health. Despite medical advances, burn survivors continue to struggle with managing the long-term psychological effects of burns (Jain et al, 2017). Burn survivors face the highest risk of mortality during the first-year post-injury, commonly from the effects of trauma and mental illness. A priority in burn care is for the resulting quality of life to be worthy of the pain endured; however, studies indicate burn survivors have considerable unmet care needs and struggle to adjust to a new life (Jeschke et al., 2020).

Burn survivors experience trauma-induced psychological distress including anxiety, depression, post-traumatic stress disorder, and concern for bodily disfigurement (Jain et al., 2017). The most common psychiatric morbidity found in burn survivors is major depressive disorder (MDD). MDD is a mood disorder characterized by a persistent depressed mood, loss of interest, or loss of pleasure for most of the day, nearly every day, for at least two weeks. Symptoms indicative of depression include feelings of sadness, tearfulness, hopelessness, worthlessness, guilt, slowed thinking, trouble concentrating, sleep disturbances, lack of energy, irritability, change in appetite, recurrent thoughts of death, and loss of interest or pleasure in most or all normal activities (American Psychiatric Association [APA], 2013). Numerous assessment tools are available for the

screening of symptoms and severity of depression across the lifespan. Common tools used in the adult population include the Beck Depression Inventory (BDI), the Center for Epidemiologic Studies Depression Scale (CES-D), the Hamilton Rating Scale for Depression (HAM-D), the Montgomery-Asberg Depression Rating Scale (MADRS), the Patient Health Questionnaire-9 (PHQ-9), and the Quick Inventory of Depressive Symptomatology-Self-report (QID-SR) (Wiechman et al., 2016).

According to Cleary et al. (2017), mental health concerns in critical burn injuries correlate with significant consequences with care, recovery, and long-term follow-up. They cite a significant body of research showing burn survivors-at high risk for depression-are not screened or treated in a reasonable time frame, while some are discharged from care without being screened at all. In a 2016 survey of United States (U.S.) hospitals, 27% denied the availability of an onsite psychologist, and psychological screening did not occur post-discharge in 64% to 79% of patients (Cleary et al., 2017). Recent measurements across three studies of depression morbidity in post-burn injury indicate a 40%, 57.9%, and 95% rate of depressive incidences (Hamzawi et al., 2018; Jain et al., 2017; Shahid et al., 2018). In a study following survivors of a water park explosion over three years, the incidence of diagnosable MDD was 20.7% at year two and 9.0% at year three (Su & Chow, 2020). Despite a decrease in MDD symptomology by year three, 18.9% continued to struggle with symptoms consistent with post-traumatic stress disorder (PTSD), and all reported greater long-term challenges physically and psychosocially, hindering their quality of life. Health-related quality of life (HRQOL) is overwhelmingly poor among burn survivors. Even a minor burn injury results in elevated anxiety and depression compared to those without burn injuries (Jeschke et al., 2020).

The purpose of this quality improvement (QI) project was to evaluate the use of the PHQ-9 assessment tool in burn survivors aged 18 and older at a large, midwestern, level one trauma center's Burn Intensive Care Unit (BICU). The aim was to increase the use of the PHQ-9 assessment tool, per policy, at admission and discharge after nursing education had occurred. The primary outcome measure of interest was the completion of the PHQ-9 assessment tool at admission and discharge. The secondary outcome measures of interest include the nurses' knowledge, confidence, and willingness to use the assessment tool and the identification of barriers to using the tool. The questions of study included:

1. What was the baseline rate of completion of the admission and discharge PHQ-9?
2. What was the change (if any) in the rate of completion of admission and discharge PHQ-9 assessments after an educational component for nursing over two months?
3. What barriers did nurses identify to completion of PHQ-9 at admission and discharge?
4. What were the changes (if any) in nurses' knowledge, confidence, and willingness to use the PHQ-9 after education?

The theoretical framework chosen to guide the process of this project was the Institute for Healthcare Improvement's (IHI) Model for Change with a Plan-Do-Study-Act (PDSA) cycle. The IHI Model for Change, with a PDSA cycle, is the preferred, scientifically valid framework for improving the quality of healthcare provided to patients (Institute for Healthcare Improvement [IHI], n.d.). The PDSA is an interactive,

four-stage model, focusing on problem-solving for process improvement and executing change. The philosophy of the cycle is to design a small test, which can be implemented in hours to days, to allow researchers to work out unforeseen problems in the process. Repeating quick small-scale tests allows for researchers to build a more successful process ready for implementation. The PDSA cycle also helps with buy-in from stakeholders. Stakeholders are more willing to accept change knowing further modifications can be made, which also assists in overcoming an organization's natural resistance to change. Utilizing PDSA cycles within the burn injury population will allow for continuous education, reinforcement of need, breaking down of barriers, and buy-in from stakeholders, especially seasoned nurses and physicians.

Review of Literature

A review of literature was conducted utilizing the search engines Medline, CINAHL, and APA PsycInfo. Key search terms included: *PHQ-9, burns, burn injury, burn patients, burn victims, mental health, and depression* with Boolean search operators AND and OR. Initially, 13,180 publications were obtained between the selected databases. Inclusion criteria included publications from 2016 to 2021 published in English that were both scholarly and peer-reviewed, adults aged 18 and older, and admission to a burn unit. Excluded studies included those with participants less than 18 years old, those participants whose burn injury occurred under the age of 18, articles focused on treatment modalities, depression related to other disorders, PHQ-9 utilization with problems other than burn injury, modified versions of the PHQ-9, and participants who were not admitted to an inpatient burn unit. After refining the criteria, the search yielded 35 studies of which 14 were selected for this review.

Depression

Following a burn injury, depressive symptoms are the most common psychological problems reported. A primary challenge to measuring depression post-burn injury is deciphering whether somatic symptoms are related to the injury, secondary to pre-existing medical conditions, are affected by environmental factors, or depression itself. Wiechman et al. (2016) conducted a systematic review to determine how depressive symptoms are assessed post-burn injury. From the 56 articles Wiechman reviewed, eleven screening tools or scales were utilized in the assessment of depression in burn survivors. This study was limited, however, due to a lack of representation of the PHQ-9 to screen for depression, as it is validated for use in both primary and specialized care settings (Wiechman et al., 2016). Reviewed articles utilized a variety of previously mentioned assessment tools for depression, including the HAM-D, BDI, and CES-D. Additionally, several studies assessed the presence of depression in an evaluation of the perceived quality of life using the Burn Specific Health Scale-Brief (BSHS-B) and EuroQol questionnaire (EQ-5D). Weichman recommends further research to identify a valid and reliable measurement tool to assist in the identification and implementation of treatment of depressive symptoms among patients in burn treatment centers. However, current recommendations from the American Burn Association (ABA) indicate the use of the PHQ-9 for screening of depression in the inpatient and outpatient setting for adult burn survivors (Druery et al., 2017).

Mental Health Outcomes

Many factors affect the relationship between burn injury and mental health outcomes. Various authors have sought to identify what factors most significantly affect

the rate of depression, anxiety, and PTSD. Burn characteristics including percent of total body surface area (TBSA) affected, location, depth, method, presence of inhalation injury, associated injuries, and complications associated with the burn injury can all play a significant role in psychiatric health post-burn injury. A study by Jain et al. (2017) found a statistically significant association between facial and deep burns with elevated rates of depression. Another study identified similar results and added to this list the traumatic nature of the burn accident, the pain experienced during burn care, thermal injuries, and a TBSA greater than 25% (Hamzawi et al., 2018). A single study varied from the others, concluding the above-mentioned factors did not significantly raise the rate of depression; however, it explained that the burn team prioritized psychological support in the immediate post-burn period to alleviate any negative long-term effects (Logsetty et al., 2016). Although each of these studies found statistically significant results, using validated assessment tools, they were all limited by small sample size and did not weigh the effects of personal and external factors that may have influenced psychological problems affecting the patients.

Pre-existing Factors

Various pre-existing factors can also impact burn recovery and mental health outcomes, including mental illness, smoking, hypertension, and alcohol and drug abuse. Such factors can cause longer recovery times, which also affect psychological adjustments, distress, financial concerns, and family and caregiver needs (Knol et al., 2020). The most common psychiatric pre-existing conditions among burn patients include substance abuse, affective disorders, psychotic disorders, and personality disorders (Cleary et al., 2017). Individuals with pre-existing psychiatric disorders are

more likely to have an inhalation injury, a larger third-degree burn TBSA percent, and a need for skin grafting surgery. They are also at a higher risk for complications including pneumonia, respiratory failure, cardiac arrhythmias, septicemia, urinary tract infection, and renal failure during admission (Hudson et al., 2017). The presence of mental illness, most commonly depression, can also complicate management and recovery from the burn injury through poor compliance with medications, dietary needs, wound care, procedures, and physical and occupational therapies. Poor compliance can lead to longer hospital stays, poor pain management, extended rehabilitation needs, and additional surgeries (Cleary et al., 2017). Additionally, a mental disorder is a significant predisposing factor in self-injurious burns; alcohol and/or drug abuse are found the most frequently. Individuals with self-injurious burn injury had more frequent mental health admissions post burn injury, compared to those with assault or unintentional burn injuries (Vetrichevvel et al., 2018).

Quality of Life

HRQOL is a measurement reflecting the perception of a patient's health condition on physical, psychological, and social wellbeing after recovering from an illness or injury. The measurement of HRQOL is crucial to assess the subjective burden experienced by burn survivors (Spronk et al., 2018). HRQOL encompasses perceived disease symptoms, functional capacity, role performance, self-esteem, social support, regard for well-being, and satisfaction (Kadam et al., 2021). A recent study found a noteworthy correlation connecting perceived social support and quality of life. The study also found a notable difference in self-esteem and psychiatric morbidity and quality of life. Another study elaborated on these results further by identifying 58.3% of

participants reporting moderate problems with mobility, 48.8% indicating problems with self-care, 47.5% stating problems with activities of daily living, 73.3% experiencing pain or discomfort, 57.9% reporting moderate symptoms of anxiety and depression, and 9.6% noting severe depression (Shahid et al., 2018). The worst of these symptoms and the lowest reports of quality of life were reported by the oldest patients. A third study showed most quality-of-life domains were affected shortly after the burn injury but were found to improve over time. The domain which included anxiety and depression also showed some improvement with time but never reached the same level as the non-burn injury scores (Spronk et al., 2018).

In summary, research indicates greater than 50% of burn survivors have diagnosable MDD. The incidence of MDD negatively impacts compliance, follow-up care, and increases the mortality risk post-injury. The need for a standardized depression screening tool for burn patients is undeniable in the research. Research indicates results obtained from the PHQ-9 are excellent in internal reliability in burn survivors (Druery et al., 2017). Additional gaps in the literature include the identification of pre-burn mental illness, long-term studies in diverse population groups, and reliability comparisons between depression screening tools in the burn population. In this quality improvement project, the PDSA cycle was utilized to increase the use of the PHQ-9 assessment tool in the burn population.

Methods

Design

This QI project utilized a mixed methods pre/post-survey design with an educational component. Following the initiation of the project, quantitative aggregate

data was collected via retrospective and prospective chart review by the principal investigator (PI), including the number of PHQ-9 assessments completed upon admission to and discharge from the BICU during the two months preceding the educational component and for two months following the educational component. Additionally, patient airway status upon admission was collected. Qualitative and quantitative data were collected by the principal investigator via survey to determine nursing knowledge, confidence, willingness to complete, as well as barriers to completion of the PHQ-9 assessment tool, both pre-and post-educational component.

Setting

This project occurred in a large mid-western level one trauma center's BICU. The 12-bed unit is the area's only verified burn center, offering full-service, multidisciplinary care for acute and reconstructive burn treatment to adults and children.

Sample

This project involved the collection of aggregate data regarding adult patients, aged 18 years and older, with a burn injury admitted to the BICU as well as a convenience sample of registered nurses who work in the BICU. Inclusion criteria for registered nurse participation in this project include being primary burn unit staff who participated in the educational component and completed the pre-and post-education surveys. Exclusion criteria for the registered nurse sample include nurses pulled from other units, those who did not participate in the educational component, and those who did not complete both the pre-and post-education surveys.

Procedures

Prior to the implementation of this QI project, a group of stakeholders met to identify the primary problem of focus, which was found to be the lack of screening for depressive symptoms. A review of the literature was conducted, and educational materials were created to increase the participants' knowledge and comfort with the PHQ-9 assessment tool. A survey was developed to assess participant knowledge, confidence, willingness, as well as barriers to the completion of the PHQ-9 assessment tool for the pre-and post-educational component. Next, the sample of participants was identified per the inclusion and exclusion criteria. The pre-survey was distributed to participants and collected by the PI prior to the educational component. The educational component was led by the PI via small groups in the BICU. For reference, the educational tool was also hung at each nursing station, on the huddle board, in the staff bathroom, and the breakroom. Two months following the educational component, a post-survey was distributed to participants and collected by the PI. Additional aggregate data was collected via retrospective and prospective chart review by the PI, including the number of patients admitted to the unit two months prior to and two months following the education, the number of PHQ-9 assessments completed on admission and at discharge during the two months prior to the education, the number of PHQ-9 assessments completed on admission and discharge for two months following the education, and patient airway status at the time of admission.

Data Collection/Analysis

As a baseline assessment, aggregate data were collected, including the number of PHQ-9 assessments completed upon admission and discharge over two months before the

educational component. Prior to and after the educational component, a survey with unique participant identifying questions was provided to registered nurses in the BICU. The survey included ten questions with a 5-point Likert scale design and one short answer question. The survey was designed to assess nurse knowledge, confidence, willingness to complete, and barriers to completion of the PHQ-9. After the education component, aggregate data were collected for the succeeding two months to assess the efficacy of the education. In the collection of aggregate data, no patient information was collected.

Inferential and descriptive statistics were utilized to evaluate PHQ-9 completion rates at admission and discharge for two months before and two months after the educational component. Additionally, a Wilcoxon signed-rank test was used to analyze pre-and post-surveys on the educational component's effect on nurse knowledge, confidence, and willingness to complete the PHQ-9. Statistical analysis was completed using the Statistical Package for the Social Sciences (SPSS), version 26. Qualitative data, including identified barriers, were categorized and summarized.

Approval Processes

Formal, written approval was obtained from the participating unit's healthcare system Research Investigator-Initiated Trials (IIT) team and the University of Missouri-St. Louis (UMSL) Institutional Review Board (IRB) prior to implementation.

Results

The sample included 17 registered nurses employed in the BICU and aggregate data from 60 admissions and 70 discharges of adult patients aged 18 years or older from this unit. Additionally, a retrospective chart review of 30 patients admitted to and 39

patients discharged from the unit from November 1, 2021, through December 31, 2021 (see Appendix A), showed two PHQ-9 screenings completed on admission and zero completed on discharge and found five patients intubated upon admission and zero unable to complete during this pre-education period (see Appendix B).

The survey and education components took place between January 1, 2022, and January 31, 2022, at which time 17 nurses met the inclusion criteria of being primary BICU staff who participated in the educational component and completed both the pre- and post-education surveys. Due to the small sample size and categorical nature of the data, a Wilcoxon signed-rank test was conducted to determine the effect of the education on the nurses' knowledge, confidence, and willingness to complete the PHQ-9. Of the 17 participants, the education resulted in a positive increase in knowledge for question one for 14 participants and no change for three participants, resulting in a statistically significant median increase, $z = 3.35, p = .001$. Similar results for question two indicated an increase in knowledge for 16 participants and a decrease for one participant, resulting in a statistically significant median increase, $z = 3.46, p = .001$. Question three also resulted in an increase in knowledge for 15 participants, a decrease for one participant, and no change for one participant, resulting in a statistically significant median increase, $z = 3.33, p = .001$. All 17 participants showed a statistically significant median increase for question four with, $z = 3.70, p < .001$. Interestingly, question number five, which asked about the participant's desire to receive further information resulted in no statistically significant median increase, $z = .93, p = .926$; however, this was an expected result. Question six referred to confidence level and indicated a statistically significant median increase for 14 participants with no change in three participants, $z = 3.40, p =$

.001. Question seven, also relating to confidence, resulted in a statistically significant median increase for 12 participants and no change in five participants, $z = 3.11, p = .002$. Question eight, a third confidence question, showed a statistically significant median increase for 14 participants with no change in three participants, $z = 3.35, p = .001$. The last question relating to confidence, indicated a statistically significant median increase for 14 participants and no change in three participants, $z = 3.35, p = .001$. Finally, the education elicited an increase in willingness to complete the screening tool for nine participants and no change in eight participants, also resulting in a statistically significant median increase, $z = 2.69, p = .007$ (see Appendix C). The themes of nurse-identified barriers to completing the PHQ-9 upon admission and discharge included: lack of inclusion in the admission/discharge navigator, intubation, lack of time, familial presence, dementia, fear of offending the patient, inability to locate the screening in the electronic medical record (Epic), being unaware that it needed to be done, and lack of discharges on the nightshift.

Following the educational component, a prospective chart review of 30 patients admitted and 31 patients discharged from the BICU from February 1, 2022, through March 31, 2022 (see Appendix A), showed 12 PHQ-9 screenings completed on admission, four completed on discharge, and six completed at another time during the admission, with three patients intubated and four unable to complete (see Appendix B). Prior to the educational component, 6% of patients had a PHQ-9 completed at admission compared to 40% after the educational component, this was a 33.3% increase. Comparably, 0% of patients had a PHQ-9 completed at discharge prior to the nursing

education and this increased to 13% after the educational component, an 86.8% increase in PHQ-9 completion at discharge.

Discussion

Implementation of this QI effort accomplished the aim of increasing the use of the PHQ-9 assessment tool in burn survivors aged 18 and over by 33.3% at admission and 86.8% at discharge. To increase the use of the PHQ-9, secondary outcome measures of assessing nurses' knowledge, confidence, and willingness to use the tool were measured and addressed using an education tool on the unit. Following the educational component, nurses' survey responses indicated a mean increase in knowledge in using the tool by 55.75%, a mean increase in confidence in using the tool by 47.5%, an increase in willingness to use the tool by 31%, and 2% reported an increase in desire for additional information on the tool (see Appendix D). Additionally, nurses identified a decrease in barriers to completing the tool at the time of the post-survey when compared to the pre-survey. The themes of nurse-identified barriers to completing the PHQ-9 upon admission and discharge following the educational component included: intubation, inability to locate in Epic, lack of time, not yet being a part of their normal workflow, and lack of inclusion in the admission/discharge navigator.

Intubation, time constraints, and lack of inclusion in the admission/discharge navigator were the three most common barriers identified by nursing staff. As a part of this QI project, the intubation barrier was addressed by identifying the appropriate time to assess post-extubation. Following this education, a 20% increase in rates of PHQ-9 completion at another time during hospitalization other than at admission occurred, however, data does not suggest this increase resulted from post-extubation completion.

The time constraint barrier was addressed by identifying opportunities for time-appropriate assessments, including during wound care as well as during the head-to-toe assessment. While not included in this project, the lack of inclusion in the admission/discharge navigator was addressed by an organic nurse-led initiative after the education of adding the PHQ-9 assessment to the unit's admission checklist, which may have impacted the results.

One limitation of this QI project included limited core staff being on this unit, causing many pull or travel nurses to admit or discharge patients without receiving burn unit-specific education. Additionally, the inability to educate the nursing team as a group and time restraints during small group education due to the unit's acuity further limited the project. Compounding on this limitation, nearly half of nurse respondents were unable to identify a barrier to completing the PHQ-9. Additional limitations include the inability to make changes in Epic to create reminders in the admission/discharge navigator, and patient cognitive disability-related or unrelated to burn injury. Lastly, an increased study length, longer than two months post-education, would allow for greater aggregate data to track the longer-term outcomes of the educational component.

Recommendations for future PDSA cycles include the addition of the PHQ-9 to the admission/discharge navigator in Epic and the addition of a screening tool for the assessment of teens and children admitted to the unit. Additionally, a yearly competency on screening for depression using the PHQ-9, as a reinforcement to this QI effort is recommended. In addition to this, a nurse-driven protocol for initiation of referrals, such as psychiatric or psychological, based on the results of the PHQ-9 screening tool should be considered to further improve patient care. Then, further study on the impact of those

referrals while inpatient and tracking outpatient follow-up for mental health care after discharge is suggested.

Conclusion

In this QI project, the rate of PHQ-9 assessment completion increased in burn survivors aged 18 and older, admitted to the BICU, simultaneously with an increase in nurses' self-reported knowledge, confidence, and willingness in completing the tool. Additionally, numerous barriers to completion were identified in this project, several of which were addressed by nurse-led changes because of the education provided. Due to the significance of this project, future PDSA cycles and data collection should take place for ongoing QI analysis addressing the mental health needs of patients with burn injuries.

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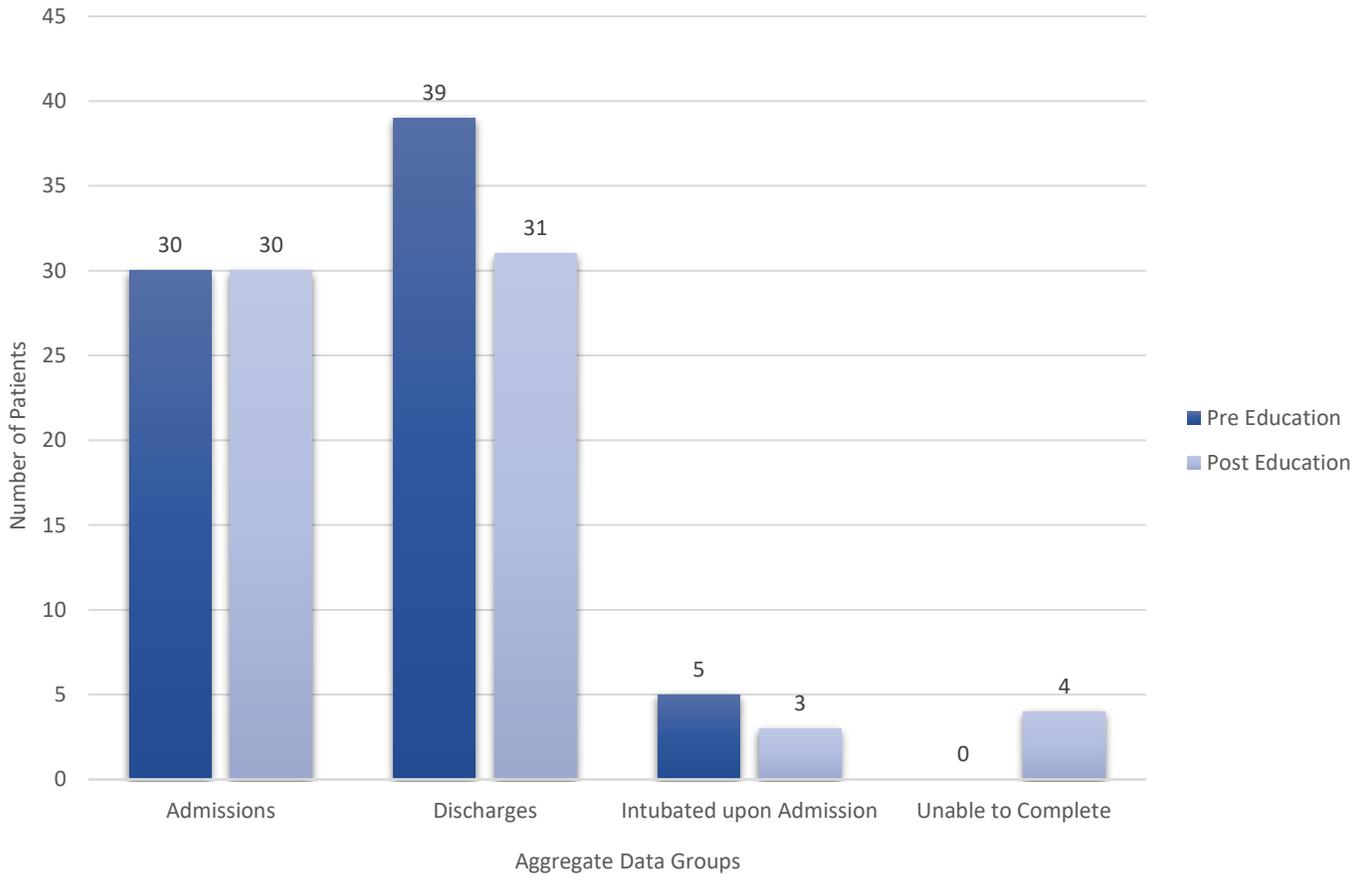
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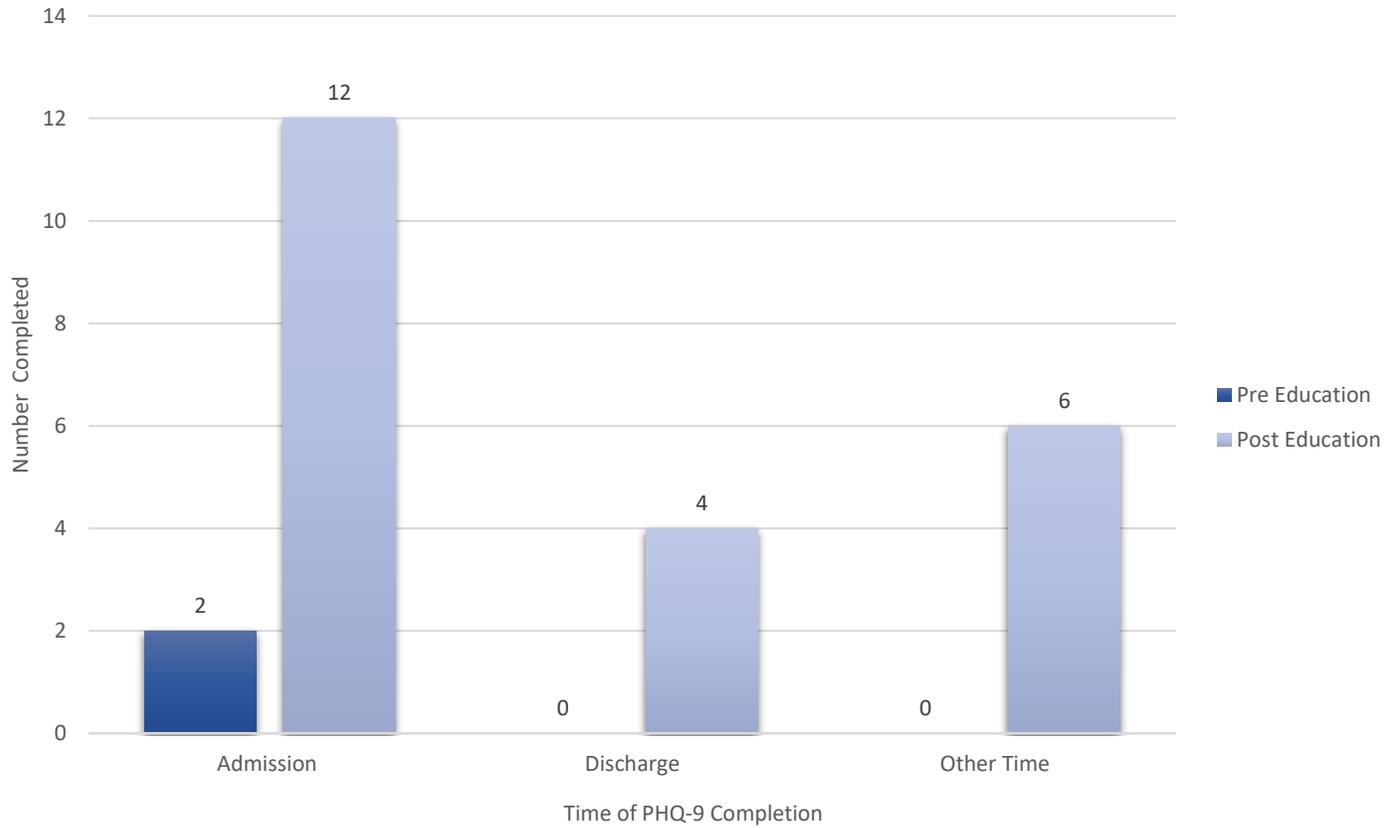
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Appendix A
Number of Patients Admitted and Discharged



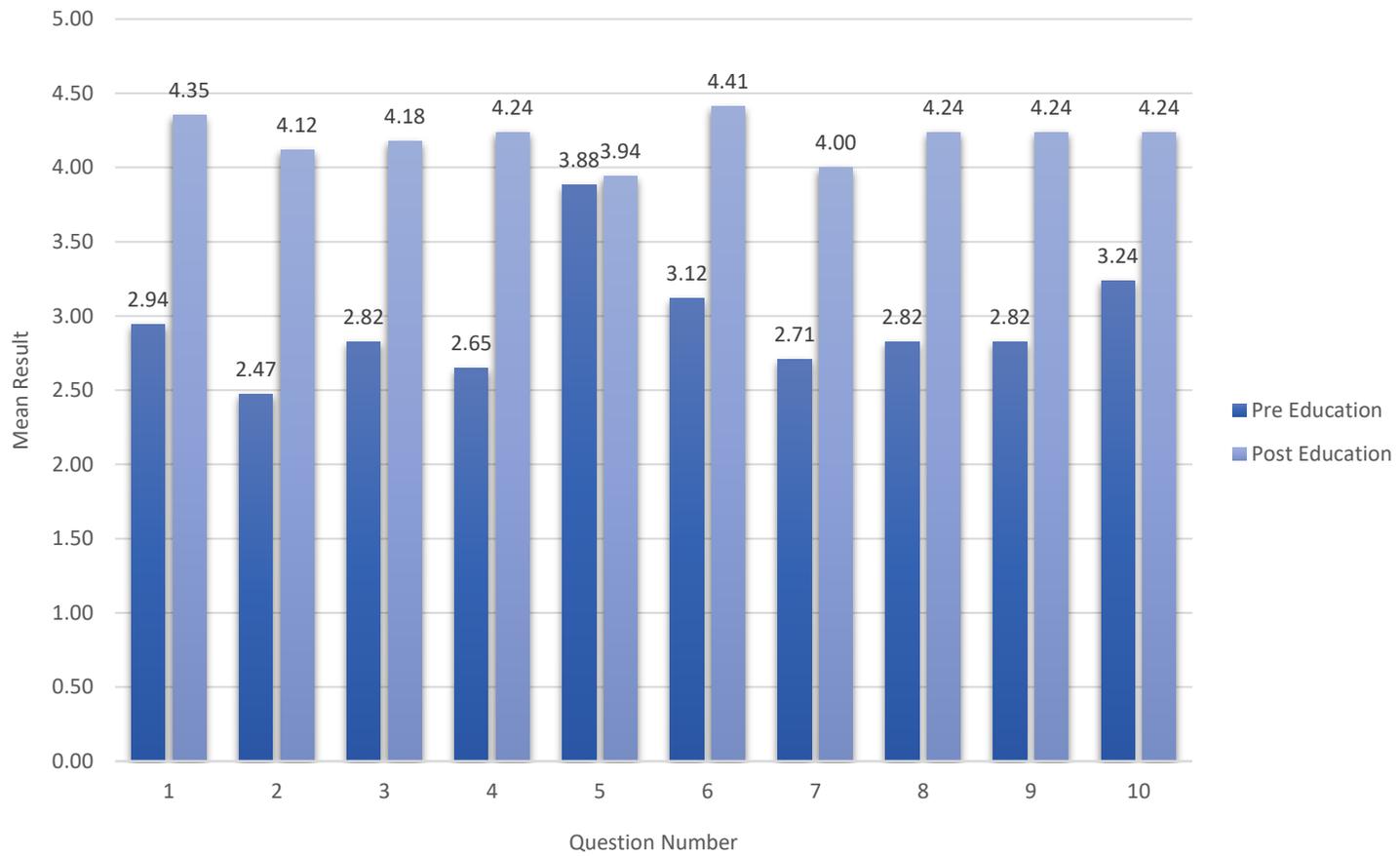
Appendix B

Number of PHQ-9 Assessments Completed



Appendix C

Mean Results from Knowledge/Confidence Survey



Appendix D
Percent Median Increase by Question

