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Implementing an Algorithm to Promptly Address Depression Screening Results in Hemodialysis Patients

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Abstract

A major mental health issue for patients with End-Stage Renal Disease (ESRD) on dialysis is depression. More than a quarter of the patients on dialysis have dealt with depression at a particular time during the course of their treatment. Being hospitalized continuously, losing self-confidence, and sometimes not having family support pose a risk for depression among ESRD patients. Screening for depression and promptly addressing the result is a key to reducing and preventing the outcomes associated with depression. The Beck Depression Inventory -II (BDI-II) tool is a valid tool for depression screening in ESRD patients. A BDI–II cutoff score of >14 to 16 implies an increased positive predictive value for diagnosing depression among ESRD patients. In many cases, patients are not referred for depression management by the nurses at the dialysis clinics even with BDI scores above 14 and 16. This project sought to establish whether using an algorithm for the BDI scores would increase the reporting rate of depressed ESRD patients to the nephrologists for evaluation and possible treatment. A group of nurses working in a hemodialysis clinic were educated on an algorithm that addressed the scores obtained using the BDI–II tool. A pretest-posttest design was adopted, and the number of referrals made before and after the education program compared. Data obtained during the project were analyzed and showed that using the algorithm produced a 100% improvement on the reports made by the nurses. The nurses further reported prompt action taken by the nephrologist to address the depression screening result.

Keywords: End-stage renal disease; Depression; Hemodialysis

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Introduction

Depression is the most common psychiatric illness in patients with End-Stage Renal Disease (ESRD), increasing over the past eight years [1], and has been associated with an increased risk of death, cardiovascular events, and hospitalization in a substantial proportion of patients [1]. End-stage renal disease is a chronic disease in which the kidneys cannot regulate electrolytes, acid-base balance, and fail to excrete waste products [2]. Hemodialysis is a form of renal replacement therapy when ESRD occurs. Because of the chronicity of the disease and its long-term treatment, kidney disease is among the high-stress illnesses [3]. According to the US Renal Data System, ESRD affects 1,810 per million people in the United States [4]. These patients encounter many stress factors that put them at risk of depression, some of which according to Treadwell [5] include fluid restriction, dietary guidelines, medication adherence, and attendance to dialysis sessions. The prevalence of depression is higher among patients receiving Hemodialysis (HD) compared to pre-dialysis CKD patients, with estimated rates ranging from 23% to 42% in the USA and Europe, and 45.9% in Taiwan [6].

Over 20% of the more than 100,000 U.S. Veterans who transitioned to ESRD over a 7.5 year period received antidepressant medications before transition, and the antidepressant prescription rate increased to almost 30% after starting on ESRD therapy [7]. In a study by Ibrahim and El Salamony [1], it was demonstrated that patients on dialysis had a higher risk of depression than predialysis patients, with a frequency of depressive symptoms of 34.5% for the dialysis group *vs.* 13.3% for the pre-dialysis group [8]. Patients on chronic hemodialysis with depression are twice as likely to die or require hospitalization within a year compared to others without depression [9,10]. These consequences of depression on this patient population call for adding a system for screening, diagnosis, and treatment of depression for all dialysis patients to improve their life [2].

Once a valid screening tool is used, there needs to be a follow-up plan for the depression sores according to the guidelines from the Centers for Medicare & Medicaid Services (cms.gov). While hemodialysis nurses perform this screening, unfortunately, in some clinics, the follow–up plan is

not utilized, or there is no plan for the nurses to use in addressing the depression scores. This project evaluated the efficiency of an algorithm (Appendix A) designed by the author based on Centers for Medicare & Medicaid Services (CMS) recommendations. The algorithm presented a follow-up plan that was utilized by the nurses to address results of the depression screening. Effectiveness of the algorithm was tested in the chosen clinic. Data were collected and analyzed with results showing that the algorithm significantly increased follow up care by the nurses.

Literature Review

The ESRD patient population has constantly increased over the past decade [11]. Hemodialysis patients encounter various stress factors including dietary restrictions, medication adherence, fluid restrictions, and constant attendance to dialysis sessions that increase their risk of depression [12]. This patient population has the highest rate of depression among individuals with chronic disorders, significantly increasing the risk of morbidity and mortality [13]. Patients on dialysis have a 45% higher likelihood of concomitant depression, indicating the need for routine screening and testing [13]. Approximately 20% to 30% of patients undergoing hemodialysis have major depressive disorder, while about 33% experience mild-severe depressive symptoms [14,15]. However, only a small number of the patients get a positive diagnosis of depression, with only 16% to 42% receiving treatment [13].

The high rate of depression among ESRD patients necessitates an effective screening approach to facilitate timely identification and treatment [14-16]. Studies also indicate that some of the current depression screening tools are ineffective, and despite nurses' determination to deliver quality care, over 50% of patients with depressive symptoms do not receive appropriate treatment [13,17]. Another study suggested that the majority of hemodialysis patients are unaware of depressive symptoms and their need for assistance with the condition [18].

A viable approach to improving the reporting of depressive symptoms among ESRD patients is the use of an algorithm using BDI-II scores. However, limited research exists about the effectiveness of an algorithm using BDI-II scores in improving the reporting of depression results among ESRD patients. It is essential to evaluate the effectiveness of using an algorithm using BDI-II scores in improving reporting of depression results among ESRD patients. Researchers have used the BDI-II scale (Appendices B & C) to design pathways for early identification of various illnesses such as metabolic syndrome and posttraumatic stress disorder [19].

In comparison, there are other scales similar to the BDI-II found in the literature on measuring depression. Watnick et al. [20] compared the BDI with the PHQ-9. Results showed that both tools were valid measures. Kung et al. [21], found similar results comparing the two assessments, noting that it should be left up to the facility to decide which tool to use. Chilcot et al. [22] also evaluated the factor structures of BDI-II and the PHQ-9 scales using Confirmatory Factor Analysis (CFA). Based on their results, the authors concluded that the BDI-II or PHQ-9 measure could be used for regular depression screening among dialysis patients. The BDI-II has also been compared to the Cognitive Depression Index (CDI) and the Hospital Anxiety and Depression Scale (HADS). While results varied, Preljevic et al. [23] evaluated the BDI, HADS and the CDI as tools for screening for depression and anxiety in dialysis patients. Their result showed that BDI and HADS are useful tools, but none was superior to the other.

Project Framework

To achieve the goal of this quality improvement project, the Plan – Do – Study – Act (PDSA) change cycle was used as a guide [24]. A primary purpose of PDSA (Appendix D) quality improvement research is to establish a functional relationship between process changes in systems of health care and variation in outcomes [25]. Using the PDSA cycle, an attainable and relevant goal was identified. The nurses were educated on the algorithm and had to screen patients and addressed the scores. This is the second step ("Do") in the PDSA [26]. The results of the nurses' actions were evaluated to check for an increase in the number of referrals made by them with the use of the algorithm which is in line with the third step (Study) of the PDSA. The last step, "Act" gave a guide for the project to use the result obtained to implement an intervention in the clinic and disseminate the results to other clinics for their use.

Objectives

The project objectives were to increase:

- The identification of depression among ESRD patients on hemodialysis and the follow-up action by the nurses working with these patients using the algorithm.
- The knowledge of the nurses on depression among hemodialysis patients.

Materials and Methods

Design

This is a Quality Improvement (QI) project initiated to promptly address depression screening results in patients on hemodialysis. The project was approved by the university IRB. The project algorithm was used by the nurses working in a hemodialysis clinic as a guide to follow up with results after conducting depression screening on these patients. As a quality improvement project, an outcome to be improved was defined, outcome measurement was identified, and a plan for implementing the intervention as well as methods to collect data pre and post-intervention were established.

Setting/Population

Setting: The project was implemented in a 12-seat medium hemodialysis clinic located in a major city in the Southwest. The clinic cares for mostly African–American adult ESRD patients as well as some Hispanics and a few Caucasians. The clinic which is open on Monday through Saturday has its patients come in for treatments on either Mondays, Wednesdays, Fridays or Tuesdays, Thursdays, Saturdays. The health care providers at the clinic include three nephrologists, four nurses, seven patient care technicians, a bio-med staff, a social worker, a dietitian, a facility administrator and an administrative assistant. They serve a total of 62 patients. One of the nephrologists serves as the medical director of the clinic. There is a clinical coordinator who is one of the registered nurses in the clinic. The facility administrator is a non-clinical office manager.

Population: A convenience sample of patients 18 years and older with end-stage renal disease and who have been on hemodialysis for more than 90 days was used for this project. Excluded in this project were the following:

- Patients with an active diagnosis of depression

- Patients diagnosed with bipolar disorder
- Patients who refused to participate
- Patients with an urgent or emergent situation where time is of the essence and to delay treatment would jeopardize the patient's health status, and
- Patients whose functional capacity or motivation to improve may impact the accuracy of results of standardized depression assessment tools (e.g. certain court-appointed cases; cases of delirium).

These exclusion criteria support guideline from the Centers for Medicare & Medicaid Services (CMS).

Measurement method

The project algorithm was used to screen the hemodialysis patients for depression using the BD- II tool [27]. The BDI-II tool is an easy tool to use in most clinical conditions for detecting major depression and recommending an appropriate intervention. The somatic and cognitive-affective dimension describes its latent structure. Depression can go undiagnosed if these somatic symptoms are not considered as they often are interpreted as symptoms of another somatic illness [28]. This tool which is one of the most commonly used measures in the ESRD population has been proven to have high sensitivity and specificity [20].

The BDI-II consists of 21 questions and each question measures *via* a 4-point scale (0–3), that when summed range from 0 to 63, with a score of below 9 indicating a normal range, between 10 and 18 mild depressive symptoms, between 19 and 29 moderate and 30 plus severe depressive symptomatology [29]. However, its relative length is a barrier, and it may be difficult for visually impaired and illiterate patients to self-administer [20].

Reliability and validity of the BDI–II tool

The BDI has been reported to be highly reliable regardless of the population with a high coefficient alpha of (0.80) and has been confirmed to differentiate depressed from non-depressed patients [2]. The BDI-II has a higher coefficient alpha than the original BDI. In an experiment carried out by these authors on depression screening of outpatients and students, the coefficient alpha for the BDI–II was (0.92) for outpatients and 0.93 for the college students, while the coefficient alpha of BDI for both populations was 0.86. Lee et al. [27] used the tool to screen for depression in 1,072 adolescent boys and girls. The Cronbach's alpha for the BDI-II total score was 0.89.

One of the main objectives of the BDI-II was to have it conform more closely to the diagnostic criteria for depression, and items were added, eliminated and reworded to assess the symptoms of depression listed in the DSM-IV accurately and thus increase the content validity of the measure [2]. This validity has been shown in the high sensitivity and specificity levels of the BDI-II tool. In a study by Watnick et al. [22], using the optimal BDI cut-off value of >16, the sensitivity for the BDI-II tool was 91% and specificity of 86%. With the same cut-off value, Chilcot et al. [29], also carried out a study that showed the sensitivity of the BDI–II as 88.9% and specificity of 87.1%.

Procedure

Pre-intervention: A gap was identified in patient care in some dialysis clinics regarding not reporting depression screening scores to nephrologists was established. An algorithm to address this issue was created by the project leader. A dialysis clinic that served more than one race was chosen. The Pearson clinical assessment team was contacted, and some BDI–II tool assessment sheets obtained. Permissions were obtained from the nephrologist, facility administrator, and clinic coordinator. Nurses' knowledge on depression within the patient population was assessed with the use of a questionnaire.

Intervention: The nurses delivered the depression screening to 24 of the nephrologists' patients. The inclusion and exclusion criteria were applied in the selection of these patients. A decision to limit the sample to 15 patients from the Monday, Wednesday, Friday (MWF) set of patients, and 9 patients from the Tuesday, Thursday, Saturday (TTS) was reached as the MWF has a higher patient load. For the MWF team, the first patients to come in for treatment that met the criteria were screened. This also applied to the TTS patients. Based on the depression scores, the algorithm was utilized to guide the next step in assisting the patients. Once the depression scores were received, the nephrologist and the social worker were made aware of the results by the nurses. The social worker got a print out of the results in her office. The nephrologist received the result during her rounding at the facility which she does twice weekly. This worked out well as the nurses received immediate feedback from the nephrologist. Using the algorithm, scores less than fourteen, were reported to the social worker and depression screenings rescheduled for the next six months. For scores above 14, with negative suicide ideation, the nephrologists was informed, and orders taken. The algorithm prompted the nurses to recheck with nephrologists if no order was given or no action taken by the nephrologists to address these patients with high scores. For patients with scores above 14 and positive suicide ideation results, the social worker was also notified. Actions taken by the social worker and nephrologists were also noted and orders carried out by nurses.

Post-intervention: At the end of every week, the project leader went back to the clinic to check the patient status and collect data on how many of the results were given to the nephrologist and social worker. The patients' directions given by the nephrologists and social worker were recorded. By the end of the third week, all results had been reported to the nephrologist. A data abstraction protocol like the one shown in Appendix E was used to record the data. The nurses were given another questionnaire at this time to assess any improvement in their knowledge of depression among ESRD patients on depression.

Statistical analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 25. The research question involved determining how the use of an algorithm based on the patients BDI-II scores would increase the frequency at which depression scores were being reported to the nephrologist. First, descriptive statistics were employed to describe the patients' demographic information including age, gender, marital status, and education level. The Chi square Automatic Interaction Detection (CHAID) tree was then used to evaluate the association between depression scores and the independent variables starting from the one with the strongest correlation. "CHAID is a tool used to discover the relationship between variables. CHAID analysis builds a predictive model, or tree, to help determine how variables best merge to explain the outcome in the given dependent variable [30]. In the CHAID tree, chi-square tests were conducted at every stage to assess its association with depression scores" (statisticssolution.com). The CHAID tree was used to evaluate the association between depression scores and the independent variables. The CHAID method involved constructing a

decision tree to split the patients into progressively smaller subgroups based on the factors that were strongly associated with depression scores. This approach was employed to identify a combination of factors including demographic characteristics, marital status, fatigue, appetite, suicide risk, sleep issue, and psychotropic medications use, that were strongly correlated with the dependent variable; depression score. A primary advantage of using the CHAID method is that it facilitates the assignment of specific values to different problems, solutions, and the resulting outcomes of each decision [31]. The CHAID method controls for Type 1 error (false positives). In addition, the CHAID tree minimizes ambiguity during decision-making [9]. The Kruksal-Wallis Test was conducted to determine whether there was a significant difference between depression scores among the four ranges: minimal, mild, severe, and moderate. The advantage of the Kruksal-Wallis test is that it can be used with non-normally distributed data [32].

Results

As shown in the bar chart, after the three-week period, the investigator reported a 100% identification and follow-up rate after the implementation of the algorithm (Appendix F). Regarding the depression categorization, 58.3% (n=14) of the participants did not meet the criteria for depression, while 41.7% (n=10) satisfied the requirement for depression diagnosis (Appendix G). Based on the CHAID decision tree, fatigue ($p<0.002$) was the most strongly associated with depression among patients as the factor resulted in the first split in the decision tree. Node 1 comprised of 13 patients who were fatigued, nine of whom were depressed (69.2%) while four (30.8%) were not. Compared to Node 1, Node 2 comprised of 11 patients who were not fatigued. However, 90.9% (n=10) of the patients were depressed, while 9.1% (n=1) were not.

Depression was also associated with age in both subsets of patients who experienced fatigue ($p<0.039$) and those who did not ($p<0.010$) (Appendix H). As shown in Node 3, all participants who were fatigued and aged below 36 years had depression, while those who were aged 36 to 45 years were not depressed. Among the fatigued patients aged over 45 years, approximately 77.8% (n=7) were depressed, while 22.2% (n=2) tested negative. Depression was also associated positively with age among the 11 patients who tested negative for fatigue ($p<0.010$). All the patients who were not fatigued and aged below 45 years were depressed, while those aged above 45 years tested negative for depression.

Depression was positively associated with marital status among the nine patients aged over 45 years who were fatigued ($p<0.046$). All the five patients who were divorced, single, and widowed had depression, while only half of those who were married and with unknown statuses tested positive for depression. There was a positive association between depression and age among the four patients who were married and those who had unknown marital statuses ($p<0.019$). Under this subset, all the two patients who were aged below 58 years had depression, while none of those aged above 58 years was depressed.

Depression score was associated with education level among patients with minimal depression ($p<0.000$) (Appendix I). All the patients with High School education or GED were depressed, while none of those with college, some college, and unknown educational levels were depressed. A significant association was found between depression scores and suicide risk among the 11 patients who had fatigue ($p<0.003$). All of the patients who had suicide risk were depressed, while none of those who did not have or had unknown conditions were depressed (Appendix J). 79.2% of the patients had sleeping issues (Appendix K). The Kruksal-Wallis Test indicated the presence of a statistically significant difference in depression scores between the four ranges, $\chi^2(3) = 13.341$, $p<0.004$, with a mean rank depression score of 9.5 for minimal, 21 for moderate, 19 for mild, and 23.50 for severe depression.

The second research question examined the "Act" component of the PDSA cycle and determined the increase in the providers using the BDI-II data following the algorithm. Also, a patient would be switched to peritoneal dialysis to help him get back to work which would help alleviate his depression. Patients with suicidal ideation received counseling sessions with the social worker. The nephrologist also set up time to discuss with some of the patients. However, no medications were prescribed at that time.

The social worker gave out resource materials to patients with scores less than 14. To the patients with scores above 14, she arranged supportive counseling sessions with them. She also arranged emergency counseling session with patients who had suicidal ideation. The questionnaire given to the nurses showed an improvement in their knowledge on the depression rate of ESRD patients. With this additional knowledge, they understand they have a role to play in assisting these patients. Patients were satisfied that their depression scores were handled promptly.

Discussion

The results showed that by using the algorithm, the nurses were able to identify depression among the patients and reported all the screening results to the nephrologist and social worker. There was a 100% identification and follow-up rate found following the implementation of the algorithm by the end of the third week. Prompt attention was given to these patients by the nephrologist and social worker. By addressing their depression, morbidity rate associated with depression is expected to improve. Introducing the algorithm to the nurses also increased their awareness and knowledge on the depression rate among ESRD patients on hemodialysis as well as created awareness in them of their importance in helping this patient population receive prompt help on their depression issue.

Depression in ESRD patients has gone virtually unexamined in the field and project data showed more than 41% of the sample had mild, moderate and severe depression. These patients were not receiving any form of psychotherapy nor pharmacotherapy prior to the project. Post-intervention, no medications were prescribed, but those that need it were started on some form of psychotherapy.

The CHAID analyses confirmed the presence of significant associations between depression scores and age, marital status, suicide risk, and depression range among the ESRD patients. Fatigue was a very common symptom of these patients and significant at $X^2=9.51$ (1), $p=0.002$. This finding adds to our understanding of depression and can help assist nurses in identifying patients with depression and providing a "pathway" for follow-up treatment with nephrologists and other mental health professionals. Similarly, age was significant (patients >45 years old), $X^2+6.514$ (2), $p=0.039$, as was marital status (patient married) $X^2=5.545$ (1), $p=0.019$. Education level was also significant for depression. A 100% of patients with a high school degree or a GED were depressed, compared to those with college degrees with 0% depression found.

Based on these findings, there is a potential for sustainability of the project as it will enhance depression screening among hemodialysis patients. Early identification and timely control of depressive symptoms among high-risk patients such as those with ESRD would result in significant savings in the cost of health care.

Limitations

The present project has a few limitations that may have influenced the reliability and validity of the findings. First, the project employed a small sample of 24 ESRD patients, which significantly increased the possibility of bias. Vasileiou et al. [33] indicates that small sample sizes can cause high variability, thus, increasing the possibility of uncoverage bias. The use of a small sample size also limited the statistical power of the project, reducing the investigator's ability to avoid Type II errors [33]. Another limitation of the present project was the lack of control for seasonal variation in the patients' depression scores. Previous studies have indicated that depression and other moods can vary based on seasons in different patients [33-35]. Future studies should employ larger samples sizes and be conducted over a prolonged period [36].

Implications

The findings of the present project have various implications for practice, future projects, and future research opportunities. For instance, investigators could apply this project to guide future projects on the implementation of algorithms in the screening of depressive symptoms among hemodialysis patients. In addition, the project can be applied in the development of depression assessment tools and algorithms in different healthcare settings. The current project demonstrated the effectiveness of an algorithm using BDI-II scores as an accurate method of identifying depression among ESRD patients. Improved reporting of depression results by the nurses would facilitate prompt identification and treatment. The implementation of the algorithm would represent the first stage of managing depression among ESRD patients. After identification of depressive symptoms, healthcare providers can deliver prompt care to the ESRD patients, thus, minimizing the likelihood of complications and mortality rate.

Because depression screening is a complex process, implementing an algorithm using BDI-II scores in hemodialysis units could be beneficial for physicians caring for high-risk populations. The depression screening algorithm would play an essential role in the objective assessment of ESRD patients' moods; therefore, clinical practice settings need to adopt accurate and reliable assessment tools. In addition, nurses should be adequately trained on how to utilize these algorithms to ensure they address the depression screening results.

The current project also employed a small sample size and only focused on ESRD patients. The findings provide an opportunity for future replication using a larger sample size for a prolonged period to improve reliability and reduce the possibility of bias. Future studies should also focus on other factors that affect clinicians' decision-making when screening depression that were not addressed in this project. Given the high likelihood of comorbidities among ESRD patients, it is important to determine the most effective algorithms for use patients with complex illnesses such as personality disorder. Future projects should also evaluate patient-and organizational-related barriers to effective depression screening among ESRD patents.

Conclusion

Depression remains under-recognized in most healthcare settings at a high disability and cost expense [38,39]. The economic burden associated with depression is approximately $210 billion, including suicides and the direct costs incurred in the workplace [40]. Depression is prevalent among ESRD patients and has also been linked with increased rates of comorbidities and mortality, and productivity-related behaviors such as absenteeism [13].

The findings of this project have demonstrated that implementing an algorithm using BDI-II scores would facilitate prompt identification and measurement of depressive symptoms among patients with ESRD [41,42]. Prompt identification of depression among ESRD patients would facilitate referral of patients to appropriate mental health professionals. In addition, the findings suggest that main barrier to depression screening is not the hidden symptoms but the lack of an effective algorithm or screening instrument to standardize evidence-based care to these patients. Therefore, future studies need to focus on evaluating more effective screening tools that facilitate prompt identification and improve ESRD patients' mental health.

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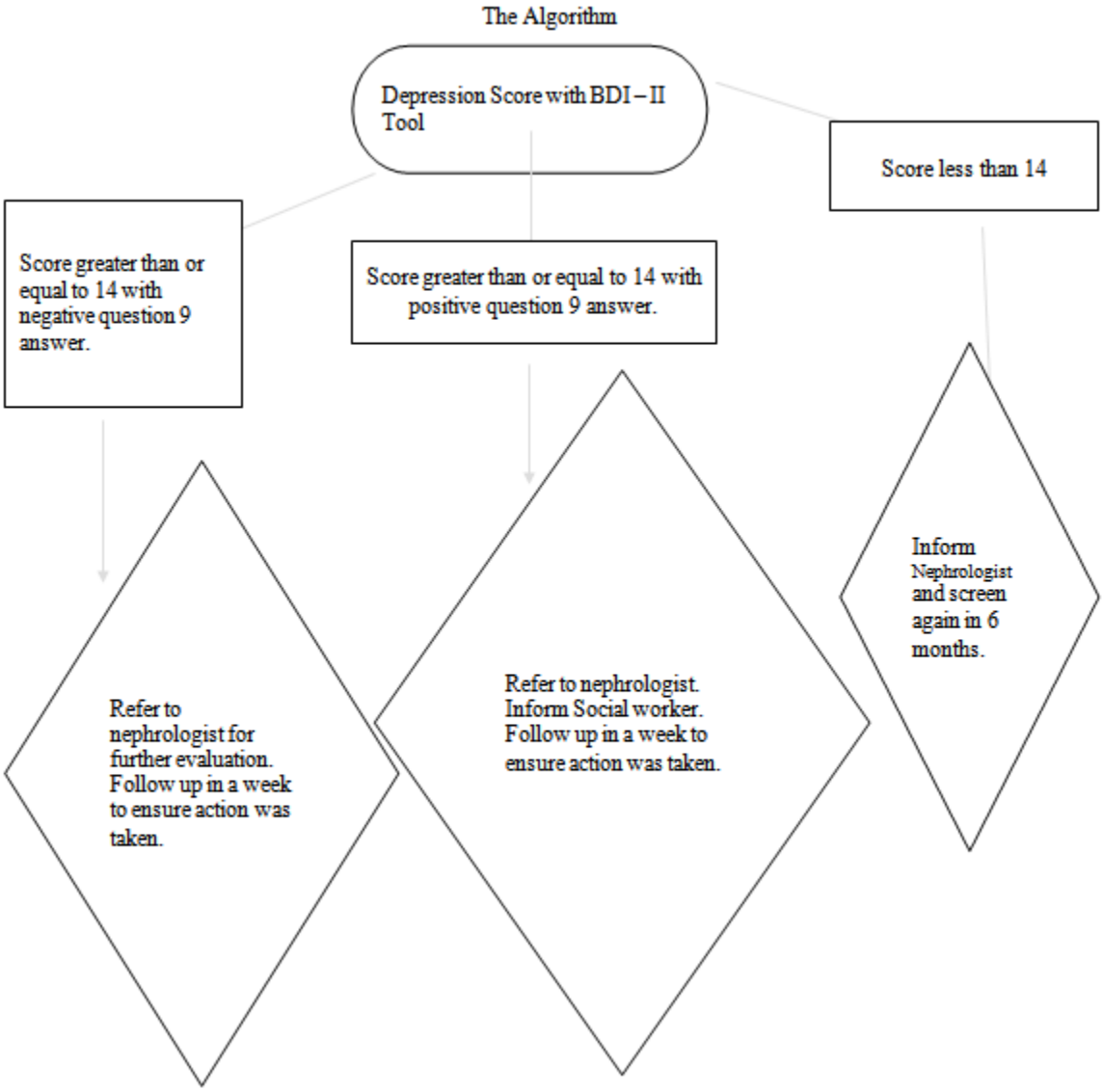
Appendix A


The Algorithm
Depression Score with BDI – II Tool
Score less than 14
Score greater than or equal to 14 with negative question 9 answer.
Score greater than or equal to 14 with positive question 9 answer.
Inform Nephrologist and screen again in 6 months.
Refer to nephrologist for further evaluation. Follow up in a week to ensure action was taken.
Refer to nephrologist. Inform Social worker. Follow up in a week to ensure action was taken.

Appendix B: Beck Depression Inventory–II (BDI–II) tool.

Roche

V 0477

Beck Depression Inventory

CRTN: _____ CRF number: _____

Page 14 patient inits: _____

Baseline

BDI-II

Date:

Name: _____ Marital Status: _____ Age: _____ Sex: _____

Occupation: _____ Education: _____

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

Subtotal Page 1

Continued on Back

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11. Agitation

0 I am no more restless or wound up than usual.

1 I feel more restless or wound up than usual.

2 I am so restless or agitated that it's hard to stay still.

3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.

1 I am less interested in other people or things than before.

2 I have lost most of my interest in other people or things.

3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.

1 I find it more difficult to make decisions than usual.

2 I have much greater difficulty in making decisions than I used to.

3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.

1 I don't consider myself as worthwhile and useful as I used to.

2 I feel more worthless as compared to other people.

3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.

1 I have less energy than I used to have.

2 I don't have enough energy to do very much.

3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.

1a I sleep somewhat more than usual.

1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.

2b I sleep a lot less than usual.

3a I sleep most of the day.

3b I wake up 1–2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.

1 I am more irritable than usual.

2 I am much more irritable than usual.

3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.

1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.

2b My appetite is much greater than usual.

3a I have no appetite at all.

3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.

1 I can't concentrate as well as usual.

2 It's hard to keep my mind on anything for very long.

3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.

1 I get more tired or fatigued more easily than usual.

2 I am too tired or fatigued to do a lot of the things I used to do.

3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I am much less interested in sex now.

3 I have lost interest in sex completely.

3 4 5 6 7 8 9 10 11 12 A B C D E

_____ Subtotal Page 2

_____ Subtotal Page 1

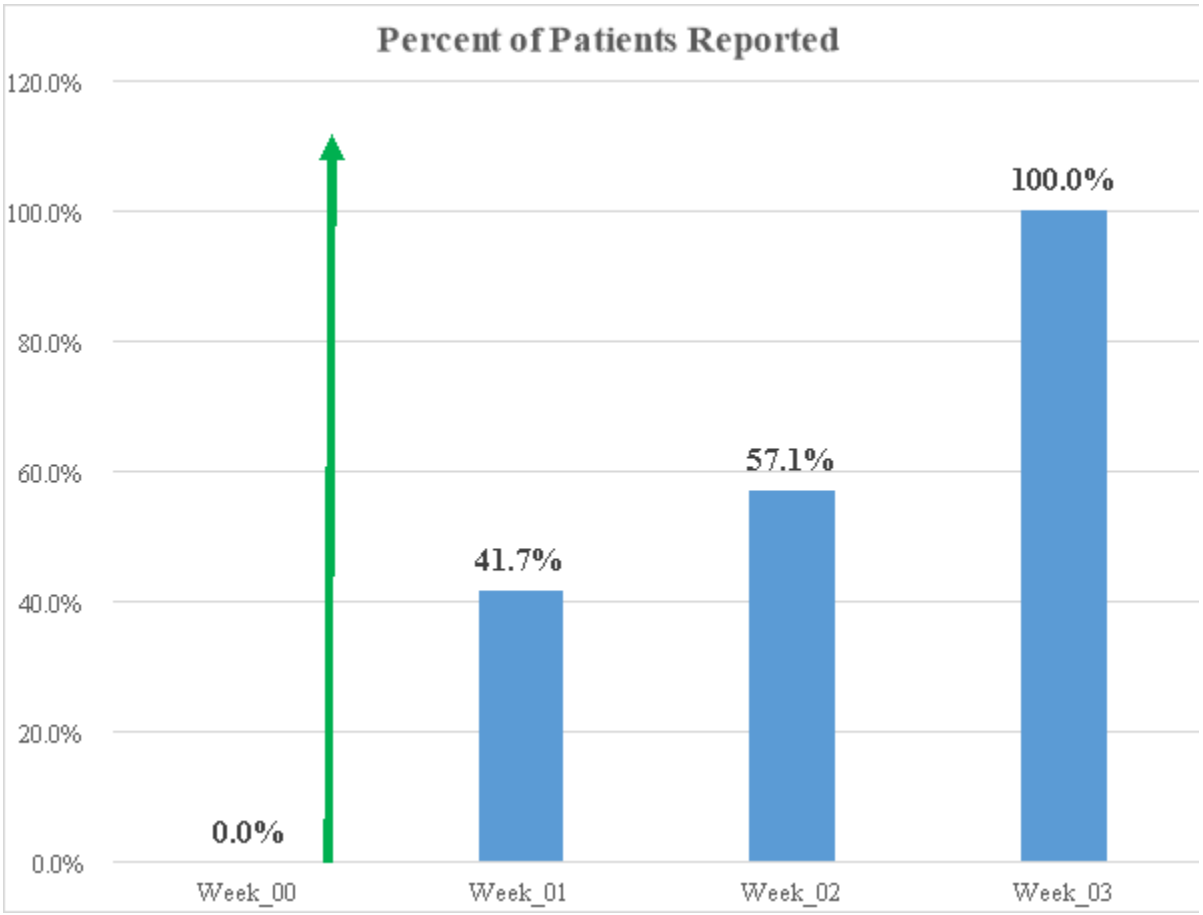
_____ Total Score

Appendix C: Beck Depression Inventory–II (BDI–II) tool.

Appendix D: Plan-Do-Study-Act Framework**.**

Appendix E: Data Abstraction Table.

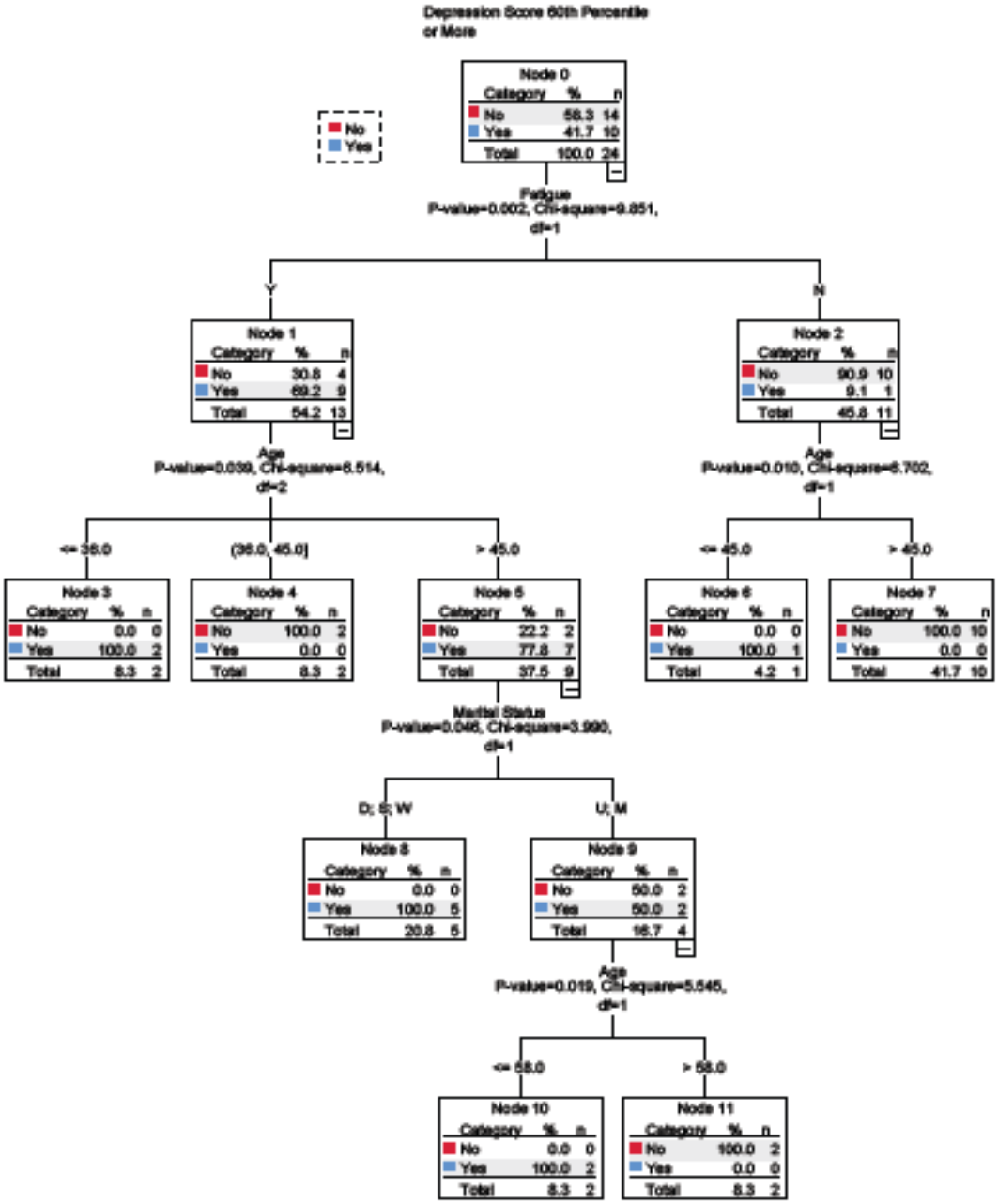
Pre-test	No of reports to Nephrologists	Post- test	Reported to Social Worker	Reported to Nephrologist
2017	0	Week 1		*10*
2018	0	Week 2	*2*	*8*
		Week 3		*6*
		Week 4		
		Week 5		
		Week 6		



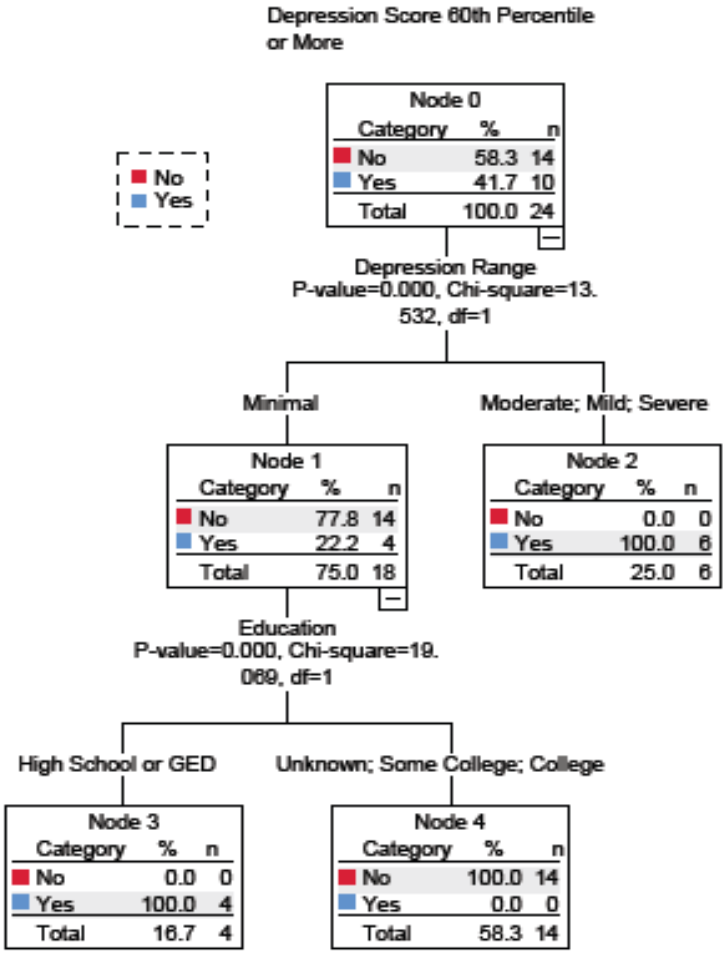
Appendix F: Post-intervention Report Result.

Appendix G: Depression Scores using the BDI–II.

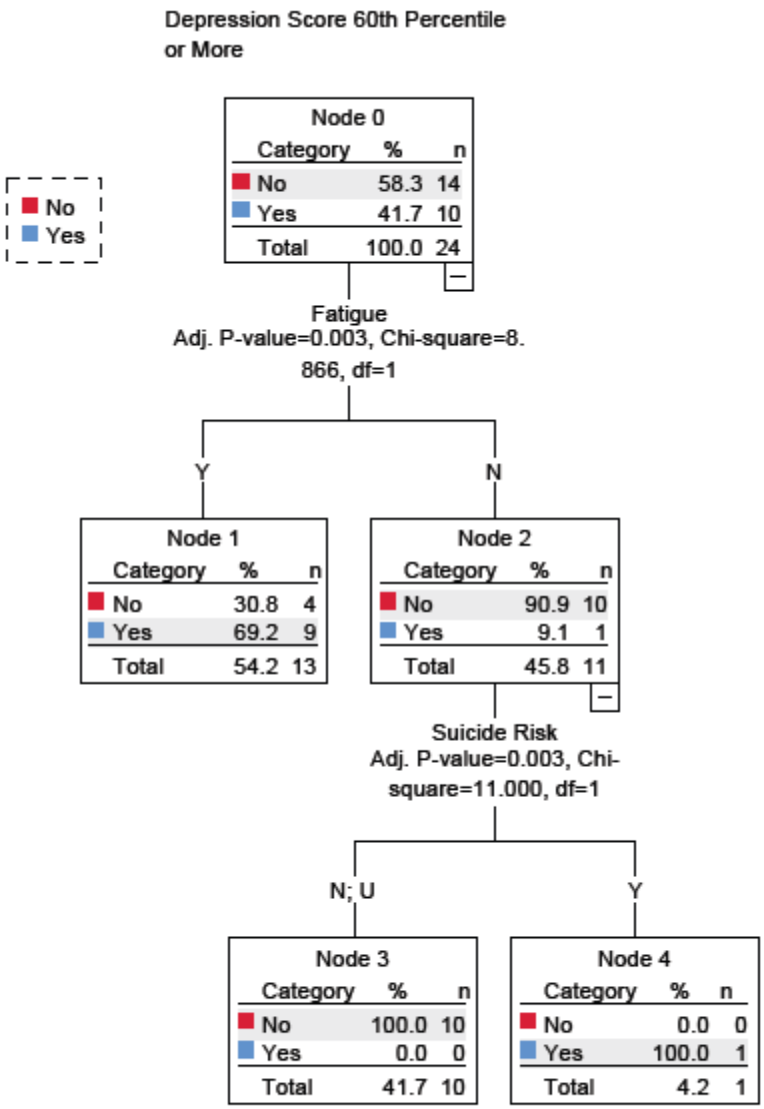
Total	Range	Frequency
0-13	Minimal	18
14-19	Mild	1
20-28	Moderate	3
29-63	Severe	2



Appendix H: CHAID Tree.



Appendix I: CHAID Tree.



Appendix J: CHAID Tree

Appendix K: Sleep Disturbance Frequency.

Sleep Issue					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N	5	20.8	20.8	20.8
	Y	19	79.2	79.2	100.0
	Total	24	100.0	100.0	

N – No; Y – Yes; T - Total