Depression Screening Protocol for MS patients in a Neurology Clinic

by

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A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

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May 2021

Abstract

Problem and Purpose: Depression is the most common symptom in Multiple Sclerosis (MS) patients with reported lifetime prevalence of 25-50%. Undetected and untreated depression in MS patients has been associated with poor psycho-social and treatment outcomes. Early detection and management of depression has been shown to ameliorate those negative outcomes and improve quality of life. Time constraints in ambulatory clinic settings can impact providers' ability to perform a thorough psychological as well as physical evaluation. To address this gap adoption of a standardized depression screening tool in the care of MS patients was an important opportunity to address a critical need and improve quality of patient care. The purpose of this quality improvement (QI) project was to implement and evaluate the effectiveness of a Depression Screening Program in adult ambulatory outpatient neurology clinic with MS patients using the Patient Health Questionnaire (PHQ-9) screening tool.

Methods: The primary aim of this QI project was to implement a depression screening protocols for adult MS patients in an outpatient neurology clinic using the Patient Health Questionnaire-9 (PHQ-9), a validated depression screening instrument. Medical assistants (MAs) completed the PHQ-9 with patients during telemedicine visits. The MS providers reviewed and provided brief intervention and referrals if warranted. The project leader mobilized a site team, trained MS providers and MAs, mentored champions, tracked the project on a weekly basis, and provided the staff with weekly data updates.

Results: PHQ-9 tool was utilized for depression screening in 144 out of 149 patients who had health visits during the 13-week period (97% compliance). Out those of 144 patients who were screened, 50% (n=72) were positive (PHQ-9 scores 5-27) for depression. 100% (n= 144) PHQ-9 scores were discussed and reviewed by MS providers. The treatment and referrals contributed to,

27.7% of patients were prescribed antidepressant,12.5% were referred to mental health providers. One patient had suicidal ideation, necessitating an urgent transfer to the emergency department (ED).

Conclusion: Depression screening program using the PHQ-9 was adopted by the neurology clinic for MS patients. This program was able to identify depression in adult MS patients and facilitate treatment or referral to mental health providers. Early detection, treatment, or referral of adult MS patients with depression may help prevent ED visit or hospitalizations and will improve the quality of life for these patients.

Introduction

Multiple Sclerosis (MS) is the most common chronic, non-traumatic neurological disorder among young adults with onset usually occurring between 20-50 years. According to the National Multiple Sclerosis Society (2019), it is estimated that 2.3 million people suffer from MS worldwide and nearly 1 million are living with MS in the United States, making it the most common autoimmune disease of the nervous system (Encarnacao et al., 2018). MS is manifested by a prodrome of symptoms including impaired mobility, fatigue, pain, depression, anxiety, cognitive impairment, sexual dysfunction, bowel/bladder dysfunctions, vision and hearing problems, seizure, and spasticity, which can be short or/long lasting or permanent.

Depression is the most common symptom in MS patients with reported lifetime depression-prevalence of 25-50%, which is higher than the 12.9% lifetime prevalence among patients with other chronic medical conditions (Ferrando et al., 2007; Patrick et al., 2019). Depression is also a predictor of suicidality in people with MS. Suicide is an important cause of death in MS due to uncontrolled depression (Viner et al., 2013). The lifetime suicidal intent is 29% and lifetime suicide attempt rate is 6.4% (Qiuyan et al., 2019). Undetected and untreated depression in individuals with MS has been associated with poor psycho-social and treatment outcomes such as anxiety, fatigue, pain, sleep disturbances, cognitive dysfunction, poorer quality of life, restricted social and economic opportunities, reduced medication adherence, MS symptoms exacerbation, and increased risk of suicide (Fragoso et al., 2014; Kiropoulos et al., 2020). Early detection, diagnosis, and treatment of depression in MS patients has been shown to ameliorate those negative outcomes and improve their quality of life (Boeschoten et al., 2017; Marrie et al., 2017).

Time constraints in ambulatory clinic settings can impact providers' ability to perform a thorough psychological as well as physical evaluation. The American Academy of Neurology (2014) recommends formal depression screening for the MS patient at least once every 12 months. The Joint Commission (TJC) and Centers for Medicare and Medicaid Services (CMS) have also affirmed the assessment of depression as an important clinical indicator for health care quality. The director of the MS Center was supportive of implementing a screening program to determine if MS patients were experiencing depression, possibly as an early diagnosis, and if detected, to facilitate management of depression for adult MS patients. To address the lack of a depression screening protocol in an Ambulatory Neurology Clinic, a neuroscience nurse practitioner (NP) identified strategies to improve this clinical practice with the implementation of program that would train providers to utilize standardized depression screening tool for all MS patients. The purpose of this quality improvement (QI) project was therefore implementation and evaluation of a Depression Screening Program in adult MS patients using the Patient Health Questionnaire (PHQ-9) screening tool which aims to assist providers to screen and detect depression and then provide interventions and referrals as warranted.

Evidence Review

Seven studies were included in this literature review including two systematic reviews, two meta-analyses, two perspectives, and one cross sectional study. All seven studies reported strong evidence for using the PHQ-9 screening tool in an outpatient, non-psychiatric setting with an emphasis on screening MS patients for depression**.** The literature review provided evidence about using a validated tool such as the PHQ-9 with MS patients. Three main themes were reviewed in these articles: depression risk in MS patients and associated adverse effects, screening of depression using PHQ-9, and brief interventions and/or referrals to mental health

providers. All studies concluded that, screening and brief interventions and/or referrals, to mental health providers for depression in adult MS patients in the outpatient setting improves patients' outcomes (Appendix A).

Two systematic reviews highlighted similar designs, sample sizes, settings, methods, and results emphasizing the importance of screening MS patients for depression. Patrick et al., 2019; Hind et al., 2015 compared the PHQ-9 to the PHQ-2 and found no significant difference between the level of depression identified with each questionnaire. Hind et al., (2015) recommended the PHQ-2 because it is quick, easy to administer, and not overlapping with the MS symptoms**.** Marrie et al., (2018) supported those findings as well. They also suggested that the higher cut-off points of the PHQ-9 are due to potential overlap of MS symptoms with somatic symptoms of depression. In contrast, Sjonnesen et al., (2012) found that MS symptoms did not invalidate the interpretation of the PHQ-9 when used in patients with MS. These items did not appear to make any substantial difference in the scale's performance in patients with MS when comparisons were made with the general population.

Researchers also found that the risks of attempted and completed suicide were 10 times greater among patients reporting elevated PHQ-9 item-9 scores and increased with persistence of the elevated scores (Dickstein et al., 2015). Additionally, Qiuyan et al., (2019) performed a meta-analysis included data from 260,752 MS patients and found that the association between suicide and multiple sclerosis was statistically significant with a suicide rate ratio (SRR) of 1.71 (95% CI 1.37 to 2.15). They also found that risk of suicide at diagnosis of multiple sclerosis (SRR 2.12,95% CI 1.84 -2.46) was higher than the risk of suicide at symptom onset (SRR 1.69, 95% CI 1.43-2.00). In contrast, the PHQ-2 is missing an important item that assesses for suicide. The PHQ-9 is a depression self-report instrument and was developed using the domains of the DSM-

IV criteria for depression reflecting the patient's mood in the previous two weeks (Hind et al., 2016; Pattern et al., 2015; Patrick et al., 2019).

The PHQ-9 is considered a valid and reliable tool with sound psychometrics for assessing depression in MS patients (scores >10, had sensitivity 88%, specificity 88%, positive likelihood ratio of 10.12 (95% CI 6.52-15.67) and negative likelihood ratio (0.22.CI 0.15 to 0.32) (Patrick et al., 2019; Patten et al, 2015). Internal validity was strong with a Cronbach's α of 0.89 (Hind et al., 2016; Patrick et al., 2019). The PHQ-9 can be completed by self-report or administered by the clinician in the clinic or via telephone (Hind et al., 2016; Patrick et al., 2019). It may be scored categorically to diagnose major depressive and subclinical depressive disorders, or it may be used as a continuous numerical measure to assess and track severity of depressive symptoms over time (Pattern et al., 2015).

Overall, the studies included in this literature reviews were relevant to the target population of this project. Furthermore, each study applied the PHQ-9 as a screening tool. All the studies had statistically significant findings, regarding sensitivity, specificity, reliability, and validity of the PHQ-9 and /or the effects screening for depression on patients' outcomes.

Theoretical Framework

Kurt Lewin's Change Theory (1947) was utilized to guide this QI project. Change is an essential component of nursing practice. Major change is always a challenge for nurse leaders. In 1947, a pioneer in the study of Group Dynamics Kurt Lewin theorized a three-stage model of change (unfreezing-change-refreezing) to identify and examine the factors and forces that influence a situation. At the beginning stage, individuals must be given assistance to overcome resistance in giving up the old behavior (Lewin, 1947). The second stage involves changing thoughts, feelings, and/or behaviors of individuals is considered to be most difficult, because of

uncertainty and fear associated with change (Shirey, 2013). The last stage, also called refreezing, is establishing the change as a new habit and is a necessary component of this theory in order is to see whether change has been implemented is retained. Lewin also describes behavior as "a dynamic balance of forces working in opposing directions" (Shirey, 2013, p.1). Driving forces facilitate the change to occur from the status quo. On the other hand, **r**estraining forces are those that counter the driving force and hinder the change.

During the Unfreezing stage, project manager and change champion helped other MS providers in recognizing and understanding why there was a need for screening and providing support for depression in multiple sclerosis patients. There was a lack of guidelines for depression screening and management in this facility, therefore, the driving force had to be applied to unfreeze the behavior. In the change stage, MS providers were provided opportunities to discuss any barrier to the practice change. Any patient outcomes were shared with clinic site advisor and MS providers during staff meetings to underscore the need for this change. MS providers were encouraged regularly to make this practice change. The third phase involved implementation of screening program for MS patients, in this case, establishing a new behavior that was expected to be permanent. With feedback from the MS providers, and the continuous support from the change champions to using this screening tool, restraining forces were anticipated to minimized, thereby the driving forces facilitated this program to be adopted by the providers.

Methods

The practice change was implemented in an Outpatient Neurology Clinic in the Mid-Atlantic region. There were three MS attending physicians, one MS NP (project leader), and four Medical Assistants (MAs), who were seeing adult MS patients via telemedicine visits. Inclusion

criteria for these visits included: patients diagnosed with MS according to the McDonalds criteria's, age > 18 years, English speaking, and not severely cognitive and physically impaired. Exclusion criteria included: no other neurological disease, non-English speaking, severely impaired cognitively or physically, deaf, clinically diagnosed with depression or currently taking anti-depressant medications. MAs completed the PHQ-9 with the patients during their tele-visit time (Appendix D and E: PHQ-9 Instrument and Scoring Classifications). MS provider reviewed the PHQ-9 scores and did an in-depth clinical evaluation during same visit to confirm the diagnosis (Appendix E). A procedure was in place if the patient verbalized suicidal ideations. This included notifying the behavioral crisis team immediately to evaluate the patient.

During implementation period, the structure measures were policy and procedure for depression screening for MS patients implementing PHQ-9 screening tool and training of staffs on PHQ-9. Process measures included the number of the eligible MS outpatients who received and completed the screening tool, the number of MS patients with positive depression scores who were offered intervention and/or referral to mental health providers. The outcome measures for the intervention were the number of MS patients who initiated new anti-depressant therapy and were adherent to the treatment regimen recommendations. The flowchart in Appendix G was produced by the project leader to simplify and elucidate the depression screening process including management for positive results. All data were entered by the project leader into a Microsoft Excel spreadsheet for further data analysis. A run chart was utilized for data analysis of this QI project. The project leader shared and discussed the run chart with providers during monthly virtual staff meetings to track the progress of the project.

The Project Proposal was submitted for IRB approval to the University of Maryland, Baltimore (UMB) and the project was approved as Non-Human Subject Research. Each week,

the project leader analyzed the de-identified data to see the progress of the project. Data collection tools were used with no identifying information and the files were stored in password-protected computer only accessible by the project leader at the clinical site. Any printed forms were kept safe in a locked cabinet at the clinical site.

Results

This Outpatient Neurology Clinic was successful in changing the major structures and process to implement this QI project. Prior to implementation, three MS providers and four MAs were educated and trained by the project leader about administering, interpreting, and documenting the results of when screening using the PHQ-9 depression screening tool, in the electronic medical record. A lesson plan was used for this training. (See Appendix B). To measure the competency of the trainees on the PHQ-9, System Usability Scale (SUS), a modified form of Likert Scale, was used (Appendix C). Their overall score was 98/100 (score at or above 68/100 is acceptable on SUS scale).

Over the 13 week of implementation period, a total of 149 patients were eligible for depression screening. Of those, 144 were screened using the PHQ-9. The scores were documented in the respective visit notes (97% compliance). Refer to Appendix: I. Out of 144 patients screened, 50% (n=72) were positive (PHQ-9 scores: 5-27) for depression. Among those with depression, 59.72% (n=43) had mild depression, 27.77% (n=20) had moderate depression, and 12.5% (n=9) had severe depression (Appendix J). The treatment and referrals contributed to, 27.7% of patients were prescribed antidepressant,12.5% were referred to mental health providers (Appendix J). One patient had suicidal ideation, necessitating an urgent transfer to the Emergency Department (ED).

Project outcomes were affected by facilitators and barriers. One of the strongest facilitators for the success of this project was the MS Center Director's wholehearted support of this project. The presence of a project champion who supported MS providers and clinic staffs to use the screening tool in the implementation period was another strong facilitator of this project. The PHQ-9 tool was an additional facilitator. All MS providers were knowledgeable about the strong validity and reliability of the tool which affirmed its use in this project. Furthermore, the incorporation of the PHQ-9 tool into the EMR before the start of implementation enhanced the success of this project. Depression scores were already populated in the visit note following the screening that was conducted by MAs during triage. This saved providers' time in the decision process about management of depression if warranted. Lastly, there were no costs for the screening. The main barrier at the beginning of the project was encountered with the MS providers, who reported time constraints and additional workload during telemedicine patient visits within assigned time-period. These barriers were discussed in detail during monthly staff meeting with the team and acceptable solutions were determined that facilitated overcoming barriers. The run chart also showed the effect of those barriers on the screening compliance when depression screening was done only by the providers. Unfortunately, we were unable to increase the total visit time allowed with each patient. However, we then changed our screening methods by allowing the MAs to do the initial depression screening while triaging the patients. As a result, our screening compliance reached nearly 100%. Additionally, the project leader was in the clinic once a week to check in with project champions to observe the compliance of screening and provide in person help if needed.

Discussion

Implementation of depression screening program using the PHQ-9 tool fostered 72 MS patients who tested positive for depression to receive mental health support. It was anticipated that 100% of the time MS providers would review patients' PHQ-9 scores during the 13 weeks of implementation, and this outcome was successfully met. Ideally,100% of MS patients would have been screened for depression each week during implementation, but this goal was not met due to time constraints. The project manager and clinical site advisor (CSA) identified the alternative ways to reduce time burden for the providers. The MAs were trained, and they then screened patient's during their telehealth visits. Additionally, the project manager sent out reminders thorough e-mail, doc halo, and sometimes in person to MAs to screen patients to meet the goal (100% compliance). Twenty-eight percent of MS patients (n=20) were started on anti-depressant medications and 13% (n=9) were referred to mental health providers. This practice change facilitated MS patients to discuss their signs/symptoms of depression and who then received mental health support to improve their quality of life. Out of the 144 patients, 72 patients (50%) were positive for depression. This finding was consistent with the literature across the United States as well as internationally (Boeschoten et al.,2017., Ferrando et al.,2007., Marrie et al., 2017; Patrick et al.,2019). The range of PHQ-9 scores in this project were similar to those found by Hinder al., 2016; Patrick et al.,2019, indicating that most patients have minimal depression (PHQ-9 scores 5-10) and no proposed treatment actions. One patient had suicidal ideation, necessitating an urgent transfer to the emergency department (ED). This finding was also consistent with conclusions found in the literature review (Qiuyan et al., 2019; Viner et al., 2013). Clinicians should become skilled at screening and assessing for suicidal risk in MS patients, because screening for suicide could be a crucial step to preventing suicide and ultimately saving lives.

The spread of the findings is also limited; Since this project was targeted specifically to MS patients at a neurology outpatient setting, the implementation process and the results are not generalizable to other settings but can offer guidance for similar implementation project. Additionally, this project had a limited timeframe for implementation; A longer implementation period would be required to assess the impact of the of the depression screening on preventing ED visits or hospitalizations and impact on quality of life.

Conclusion

The prevalence of depression in MS patients is remarkably high and if not diagnosed and treated could lead to detrimental outcomes. This QI project found that depression screening using the PHQ-9 tool is a cost-effective, user friendly, and time-efficient approach to identifying depression in adult MS patients and ensuring subsequent treatment or referrals to mental providers. This project is beneficial, and the results illustrate the significance of project sustainability. The sustainability of this project is dependent on the MS providers' adherence and support to continuing the screening process, after this initial implementation period. Additionally, it will be important to identify a clinic champion who will continue to support MS providers and clinic staff to use the screening tool in the post-implementation period. Furthermore, the structure change of placing the PHQ-9 into the provider note within the electronic health record gives this project the opportunity for sustainability. The PHQ-9 screening results are now in a flow sheet that providers see every time they open patient's encounter. A challenge to sustainability is that a process was not built into the practice to support reminders for the MS providers to improve documentation compliance. A future QI project is needed to build in these important structural changes. Another future project to help with sustainability includes spreading implementation of the depression screening tool in other busy

subspecialty clinics within the organization. In conclusion, when providers are trained and use a standardized depression screening tool for MS patients, early detection, treatment, or referrals for mental health support may improve quality of life.

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Appendix A. Evidence table

Citation: Dickstein, P. L., Viguera, C. A., Nowacki, S.A., Thompson, R. N., Griffith, D. S., Baldessarini, J. R.., & Katzan, I. (2015). Thoughts of death and self-harm in patients with epilepsy or multiple sclerosis in a tertiary care center. *The Academy of psychosomatic Medicine, 15(26),44-51*. Retrieved from www.psychosomaticsjournal.org					Level (Melnyk) **IVB**
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"We sought to (1) estimate the prevalence of thoughts of being better off dead or of self-harm among patients with epilepsy or MS, (2) identify risk factors for such thoughts, and (3) determine whether any risk factors interact with depression to predict such thoughts."	Retrospective Study	**Sampling Technique:** Convenience **Eligible Participants**: All adult patients aged ≥18 years evaluated at the study sites between October 1, 2007 and August 13, 2012. The diagnoses were based on clinical neurologic assessments leading to an International Classification of Diseases, Ninth Revision (ICD-9) diagnosis of epilepsy (345.0) or MS. **Excluded**: If PHQ item-9 (thoughts of death or self-harm) was unanswered. **Intervention**: 2763 patients with epilepsy and 3823 patients with MS who completed the PHQ-9 at least once. **Power Analysis:** There is no power analysis. Risk for Type II error.	**Intervention protocols:** Patients complete questionnaires with electronic tablets provided in waiting rooms before each clinic visit. The responses are immediately available within the electronic health record for review by the treating physicians during each visit, who answer provider-specific questions pertaining to diagnosis and treatment. Patient-entered data, as well as clinical data from the electronic health record, are stored in the Knowledge Program database. **Treatment Fidelity:** Discussed in detail about the protocol.	**Dependent Variable:** Depression and suicidal ideation in MS and Epilepsy patients**.** **Measure:** **PHQ-9:** A **V**alidated, self-reported, clinical assessment measures employed routinely at the study sites to screen for depression and suicidal ideation. T**he Liverpool Seizure Severity Scale** is a 20-item self-reported questionnaire that assesses seizure severity in patients with epilepsy based on perceived control over seizures as well as ictal and postictal characteristics, with scores ranging from 0 (low *severity*) to 100 (high *severity*). **The Multiple Sclerosis Performance Scale** is an 11-item, self-reported measure of MS-related disability, of which we	**Statistical results:** Among patients with MS, 14.7% (562 of 3823) reported thoughts of death or self-harm at least once. Maximum scores of 1, 2, or 3 were given by 10%, 3%, and 2% of patients with MS, respectively. PHQ-8 total scores and PHQ-9 item-9 were significantly correlated ($r = 0.44$, $p < 0.0001$). Risk factors associated with thoughts of death or self-harm in patients with MS included male sex (OR = 1.51, $p = 0.001$), white more than African American race (OR = 0.62, $p = 0.007$), presence of co-occurring medical disorders (OR = 1.25 for 1; OR = 1.41 for ≥2 disorders, $p = 0.004$), and lower QOL scores (OR = 0.83, $p < 0.0001$).

		Group Homogeneity: Intervention/Control homogenous based on Table 1 for demo and clinical characteristics.		considered 8 items: mobility, hand function, vision, fatigue, cognitive, bladder/bowel, sensory, and spasticity, with scores ranging from 0 (no *problem*) to 41 (unable *to perform*).	Patients with MS who had depression (PHQ-8 total score ≥10) were more likely to report thoughts of death or self-harm (item-9); this association was stronger among unmarried patients and those with greater neurologic illness severity (both $p <$ 0.0001). The association with depression was highest among widowers, followed by divorced, married, and then single patients (all $p <$ 0.0001). Disease severity further influenced the degree that depression affected item-9 responses, with the effect decreasing as neurologic disease severity increased ($p <$ 0.0001). There was no significant association of item-9 scores with age or income that depression affected item-9 responses, with the effect decreasing as neurologic disease severity increased ($p <$ 0.0001). There was no significant association

					of item-9 scores with age or income.
Citation: Hind, D., Kaklamanou, D., Beever, D, R., Lee, Ellen., Barknam, M., & Cooper, C. (2016). The assessment of depression in people with multiple sclerosis: A systematic review of psychometric validation studies. *The Journal of BMC Psychiatry,16(278),1-18*. doi: 10.1186/s12888-016-0931-5.					Level **IA**
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The purpose of the present study was to review the evidence for the validity and reliability of self-report depression inventories in PW MS, in line with the COSMIN standards, with the aim of providing clinicians and researchers with a rational basis for choice."	Systematic Review	**Search Strategy:** Electronic searches via evidence was gathered from the databases MEDLINE and psycINFO through OVID. **Search terms**: multiple sclerosis, depression assessment, validity, and reliability. **Sample**: 21 studies are included in this study. 5,991 people with MS are included in this study. **Eligible Studies**: Peer reviewed research journal with primary research data. **Excluded**: Commentaries, letters, dissertations, and editorial papers. **Prisma**: Included detailing criteria for	**Control**: Not applicable- no randomized controlled trials included. **Intervention**: All studies included in the SR involved the evidence for the validity and reliability of self -report depression inventories in MS. **Intervention Fidelity**: Not applicable.	**Dependent Variables:** Reliability and validity of self-report depression inventories in MS patients. **Measures**: Beck Depression Inventory (BDI). Chicago Multiscale Depression Inventory (CMDI), Hospital Anxiety and Depression Scale (HADS), Patient Health Questionnaire (PHQ-9), and Patient Reported Outcomes Measurement Information System Depression 8-item bank (PROMIS).	**Level of Measurement**: A standardized data extraction form was used, which included details about the study (authors, year, country), the samples (size, diagnoses, method of recruitment, baseline demographic characteristics), and types of validity or reliability assessed, as defined by the Consensus-based Standards for the selection of health status Measurement Instruments checklist (COSMIN) checklist (e.g. internal consistency, reliability, measurement error, criterion validity, structural validity, content validity, cross-cultural validity)

		retaining/omitting studies from SR.			Outcome data were extracted as reported. One member of the review team (RW) extracted data, a second (DK) independently checked the extraction and a third (DH) checked a proportion of the extraction from the two members. When working through the COSMIN checklist. any discrepancies between the data extracted from the papers and the definition of the checklist were discussed within the team **Outcome data Retrieval:** **Analysis:** PHQ-9: The reliability of the PHQ-9 ($n = 2$), internal consistency was good ($\alpha = 0.82$ with inter-item correlations of 0.35–0.67 (moderate to acceptable; item-total correlations were good for anhedonia (0.71), acceptable for depressed mood (0.65), and moderate for fatigue (0.57) and

					concentration (0.55) subscales. **Conclusion:** All instruments identified in this review need further work on validation and reliability for use in people with MS. Based on the available evidence regarding these measures, researchers and practitioners are faced with trade-offs depending on their priorities. In addition, researchers conducting further studies need to pay special attention to the contamination of the depression inventory scores overlapping with the MS symptoms. However, it may be that a strategic re-evaluation is required in the approach to measuring depression in people with MS. Rather than researchers pursing a piecemeal approach to specific psychometric properties of a range of outcome an alternative might be to move towards constructing and adopting Quality of

					Life measures that emphasize the fulfilment of a person's needs rather than prioritizing the severity of specific symptoms. **SR Bias Risk**: based on the methodology described, bias risk is low.
Citation: Marrie, A. R., Zhang, L., Lix, M. L., Graff, A. L., John, R., …Berstein, N. C. (2018). The validity and reliability of screening measures for depression and anxiety disorders in multiple sclerosis. *Journal of Multiple Sclerosis and Related Disorders, 20(18)*,9-15. Retrieved from www.elsevier.com/locate/msard					Level **VI B**
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"We aimed to evaluate the validity and reliability of multiple screening measures for depression and anxiety for use in the clinical care of people with multiple sclerosis (MS)."	Cross Sectional, Observational study	**Sampling Technique**: Convenience. **Eligible Participants**: Patients with MS in this cross-sectional study were recruited from the database from November 2014 through July 2016 we recruited individuals from the sole provincial MS Clinic with a definite diagnosis of MS, who were aged ≥18years, able to provide informed consent, and with an adequate knowledge of English to complete	After providing informed consent, participants completed questionnaires, and underwent physical assessments. If possible, they participated in the Structured Clinical Interview for DSMIV-TR Axis I Disorders – Research version (SCID) the same day If not the SCID was completed within two to four weeks of enrollment. A subgroup of participants completed the screening measures	**Dependent Variables**: To evaluate the validity and reliability of multiple screening measures for depression and anxiety in MS patients. **Measures**: Depression was measured by the Patient Health Questionnaire (PHQ9) and PHQ-2. The PHQ-9 includes nine items with response options of 0 (not at all) to 3 (nearly every day) and assesses depressive symptoms over the last two weeks. Total scores range from 0 to 27. The	We summarized the characteristics of study participants using frequency (percent) for categorical variables and mean (standard deviation (SD) or median (interquartile range (IQR) for continuous variables. Missing data were not imputed; individuals with missing values for a measure were excluded from analyses of that measure. Of 253 participants, the SCID classified 10.3% with major depression and 14.6% with

		questionnaires and interviews. **Excluded**: Patients with other neurological diseases. **Accepted**: 253 MS patients,2/253 were lost in the follow up period. **Power analysis**: There is no power analysis. Risk for Type II error. **Group Homogeneity**: Homogeneous based on Table 1 for demo and clinical characteristics.	again within two weeks of initial administration. **Treatment Fidelity:** Discussed in detail about the protocol of the study. Treatment was administered by licensed neurologist.	PHQ-2 includes the first two items from the PHQ-9 and has been promoted as a briefer screen for depression Scores range from 0 to 6. Anxiety and Depression were measured by the Hospital Anxiety and Depression Scale (HADS). The HADS includes 14 items, 7 for depression and 7 for anxiety, which assess symptoms over the past week. Total scores for each of the two subscales range from 0 to 21. **Treatment Fidelity:** Discussed in detail about the protocol of the study. Treatment was administered by licensed neurologist.	generalized anxiety disorder. Among the depression measures, the PHQ-9 had the highest sensitivity (84%) ranged from 93.8% to 95% and specificities ranged from 61.2% to 85.9%. In ROC analyses the area under the curve (AUC) did not differ between depression measures. Among the anxiety measures, sensitivity was highest for the HADS-A with a cut-point of 8 (82%). Specificity ranged from 83% to 86% for all measures except the HADS-A with a cut-point of 8 (68%). The AUC did not differ between anxiety measures.
Citation: Patrick, S., & Connick, P. (2019). Psychometric properties of the PHQ-9 depression scale in people with multiple sclerosis: A systematic review. *Journal of PLOS One, 14(2),1-12*. Retrieved from https://doi.org/10.1371/journal.pone.0197943					Level **IA**
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results

"To synthesize published findings on the psychometric properties of the 9-item Patient Health Questionnaire (PHQ-9) when applied to people with multiple sclerosis (pwMS)."	Systematic Review	**Search Strategy:** Electronic searches via evidence were gathered from the databases 'PubMed', 'Medline' and 'ISI Web of Science', supplemented by hand-searching of references from all eligible sources. Search terms used were 'Multiple Sclerosis' 'PHQ-9', and the related terms ('MS', 'Disseminated Sclerosis', 'PHQ Patient Health Questionnaire', 'Patient Health Questionnaire 9', 'PRIME-MD'). Included studies were published between 2012 and 2017 by research groups based in the USA (n = 4) and Canada (n = 3) **Eligible Studies:** Primary literature written in English and published following peer-review with a primary aim to evaluate the performance of the PHQ-9 in pwMS **Included:** 7 articles were included related MS and PHQ-9. **Prisma**: Included detailing criteria for	Eight performance indicators were measured to evaluate performance of the pHQ-9 in pwMS: **Appropriateness** was defined by identification of whether the PHQ-9 was being tested as a screening, diagnostic, or monitoring tool for depression/suicidality in pwMS. **Reliability** was defined by evaluation of internal (e.g., split-half / Cronbach's alpha) and external measures (test-retest). **Validity** was defined based on criterion, concurrent and discriminant approaches. Studies that attempted to define the dimensionality of the PHQ-9 were also interpreted to represent validity studies for the underlying constructs of depression and suicidality. **Responsiveness** was defined as a determination of QOL change and/or therapeutic response. **Precision** was defined as exploration of	**Dependent Variable**: Quality of life. **Measure**: Quality of life was measured with SF-36. These scales are further combined into 2 scales: a physical component summary score (PCS), which contains information about physical health status (PHS), and a mental component summary score (MCS), which informs about mental health status (MHS). All item scores are transformed into a scale from 0 (poor health) to 100 (optimal health). Cronbach's alphas for the summary scores were 0.87 for PCS and 0.78 for MCS in PD patients, and 0.89 for PCS and 0.89 MCS for patients with MS. alternative scoring paradigms and evaluation of their relative utility. Interpretability of scores was defined as using ecological validation approaches and/or relationships to QOL or other depression indicators. **Acceptability** was defined as the	Seven relevant studies were identified, these were of high quality and included 5080 participants from all strong evidence was found supporting the validity of the PHQ-9 as a unidimensional measure of depression. Used as a screening tool for major depressive disorder (MDD) with a cut-point of 11, sensitivity was 95% sensitivity and specificity 88.3% (PPV 51.4%, NPV 48.6%). Alternative scoring systems that may address the issue of overlap between somatic features of depression and features of MS per se are being developed, although their utility remains unclear. However, data on reliability was limited, and no specific evidence was available on test-retest reliability, responsiveness, acceptability, or feasibility. **Conclusions:** The PHQ-9 represents a suitable tool to screen for MDD in pwMS. However, use as a

		retaining/omitting studies from SR. **Power Analysis:** Not applicable to SR critique.		collection of participant feedback either quantitative or qualitative. Feasibility was broadly interpreted as data on practical aspects of administration such as completion rates, time to complete, suitability for various subpopulations (e.g., sensory impaired etc.).	diagnostic tool cannot currently be recommended, and the potential value for monitoring depressive symptoms cannot be established without further evidence on test-retest reliability, responsiveness, acceptability, and feasibility. **SR Bias Risk**: based on the methodology described, bias risk is low.
Citation: Qiuyan, S., Haitao, L., Dan, X., Hui, W., Quanzhen, Z., & Yanming, X. (2019). Assocaition between suicide and multiple sclerosis: An updated meta-analysis. *Journal of Multiple Sclerosis and Related Disorders, 34(2019),83-90*. Retrived from https://doi/10.1016/j.msard.2019.06.012.					Level **IA**
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"To evaluate the risk of suicide in multiple sclerosis patients based on meta-analysis of previously published databased "	Metanalysis	**Search Strategy:** Electronic searches via evidence was gathered from the databases PubMed, EMBASE, and Web of Science databases using the keywords 'multiple scleroses and 'suicide' and included articles published until December 2018.	**Control**: Not applicable- no randomized controlled trials included. **Intervention**: All studies included in the metanalysis involved the evidence for a significant association between suicide and depression in MS patients.	**Dependent Variables:** Suicide risk in MS patients **Measurement:** The pooled suicide rate ratio (SRR) in multiple sclerosis was calculated from both the extracted standardized mortality ratio (SMRs) and relative risks (RRs).	The association between suicide and multiple sclerosis was statistically significant with a pooled SRR 1.72 (95%CI 1.48–1.99, I-squared = 55.0%). Risk of suicide at diagnosis of multiple sclerosis (SRR 2.12, 95% CI 1.84–2.46; I-squared = 4.4%) was higher than

		Search Terms: Multiple Sclerosis, Depression, and Suicide. **Sample**: 16 studies are included in this study. Peer reviewed research journal with primary research data. **Excluded**: Commentaries, letters, dissertations, and editorial papers. **Prisma**: Included detailing criteria for retaining/omitting studies from metanalysis. **Power Analysis:** Not applicable to metanalysis critique.	**Intervention Fidelity**: Not applicable.		the risk of suicide at symptom onset (SRR 1.69; 95% CI 1.43–2.00; I-squared = 0.0%).
Citation: Sjonnesen, K., Berzins, S., Fiest, M.K., Bulloch, G. M.A., Metz, M.L., Thomas, D. B., & Patten, B.S. (2012). Evaluation of the 9-item patient health questionnaire (PHQ-9) as an assessment instrument for symptoms of depression in patients with multiple sclerosis. *The Journal of Postgraduate Medicine,124(5), 69-77.*doi: 10.3810/pgm.2012.09.3595.					Level **VI B**
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
"To determine the extent to which scores on the PHQ-9 are contaminated by patients reporting symptoms attributable to MS."	Prospective, Cohort Study	**Sampling Technique:** Convenience. **Eligible Participants**: The study sample frame was a patient registry maintained by the only MS clinic in a geographical catchment area, which serves	**Intervention Protocols:** A simple random sample of 500 patients was sent a recruitment letter by mail from the clinic director, asking if they would like to participate in the study. Letters were sent out in	**Dependent Variables:** To determine whether symptom contamination was a serious issue with use of the PHQ-9 in patients with MS. **Measurement:** The 9-item Patient Health Questionnaire (PHQ-9) is a brief self-report	Conventional PHQ-9 algorithm and cutoff point scoring yielded 2-week prevalence estimates of 9.8% and 21.4%, respectively, in patients with MS, and 3.3% and 8.4%, respectively, in the general population. In

		approximately 4000 clients living in southern Alberta, Canada. Of these, there were 3099 eligible patients who had not previously opted out of research, had not been discharged from the MS clinic, and had a diagnosis of MS recorded on $ 1 visit between 2003 and 2009. Recruitment took place from June 2011 to December 2011. **Accepted**: 173 MS patients **Control:** 3304 general population. **Power Analysis**: There is no power analysis. Risk for Type II error.	batches of 50 or 75 to ensure timely follow-up and a staggered start for the study. Those interested in participating were invited to contact the research team directly by telephone, mail, or e-mail. If they chose not to participate, they could return a negative response card (postage paid) by mail, fax, or e-mail. A reminder letter was sent to no responders 3 weeks after the first mailing. When a participant contacted the study team, an eligibility interview was conducted by telephone or e-mail, a full description of the study was provided, and informed consent was obtained. We encouraged participants to take part in an internet-based data-collection process, but if they did not have internet access or were not comfortable with the process, telephone interview or paper-based questionnaire options were offered.	questionnaire adapted from the physician administered Primary Care Evaluation of Mental Disorders (PRIME-MD) diagnostic instrument used in clinical and research settings.13 Several data meta-analyses have validated this instrument to detect major depressive episodes in a variety of settings, including primary care,14–16 and the PHQ-9 is used worldwide.16 The PHQ-9 requires users to rate depressive symptom frequency over the past 2 weeks. The scale can be used to generate ordinal symptom ratings or to classify patients as having a relatively high versus a relatively low probability of MD.13 The 9 distinct items of the PHQ-9 are based on the 9 symptoms listed in the “A” criterion for major depressive episode in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text	both samples, conventional and modified scoring methods were strongly correlated (Spearman rank correlation coefficient. 0.9). The proportion of total scores contributed by fatigue and concentration items was not different between samples. With adjustment for other depressive symptoms, the MS sample had greater odds of endorsement for guilt (odds ratio 2.17; P = 0.025) and fatigue (odds ratio, 1.51; P = 0.046). With adjustment for the remaining items, there was a significantly higher frequency of endorsement of fatigue in subjects with MS, but the effect was small (OR, 1.5; 95% CI, 1.01–2.26). Corrected item–total correlations for fatigue and concentration deficits were > 0.55 in both samples with all scoring methods, which is well above the minimum accepted item– total correlation value of

				Revision (DSM-IV-TR).	0.20.30 The corrected item–total correlation coefficients for fatigue and concentration deficits were not different between the MS and general populations**.**
Citation: Viner, R., Patten, B.S., Berzins, S., Bulloch, G. M.A., & Fiest, M. K. (2014). Prevalence and risk factors for suicidal ideation in a multiple sclerosis population. *Journal of Psychosomatic Research ,76(4*), *312-316*. doi: http://dx.doi.org/10.1016/j.jpsychores.2014.12.010.					Level **VI B**
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
"To estimate the prevalence, incidence and determinants of suicidal ideation in the multiple sclerosis (MS) population."	Prospective, Cohort Study	**Sampling Technique**: Convenience. **# Eligible**: patients with diagnosis of MS on more than one clinic visit between 2003 and 2009, not to have been discharged from the clinic. **Excluded**: Patients with suicidal ideation **# Accepted**: 476 MS patients. 288/476 did not agreed to participate. **# Control**: NA # Intervention: 188 MS patients. **Power analysis**: There is no power analysis.	**Intervention:** 188 MS patients were given the option of completing the questionnaire online, on paper or via a telephone interview. **Intervention fidelity**: Discussed in detail about the protocol of the study. Treatment was administered by licensed neurologist. The study only ran for 6 months, whereas both MS and mental health conditions are long-standing issues.	**DV**: The prevalence of suicidal ideation in MS patients. **Measurement tool (reliability), time, procedure:** Suicidal ideation was assessed using item 9 from the PHQ-9. Participants reporting "thoughts that you would be better off dead or hurting yourself in some way" on "several days" or more during the preceding 2 weeks were classified as having suicidal ideation.	**Statistical Procedures(s) and Results**: Descriptive statistics were calculated for the demographic variables. The point prevalence of suicidal ideation was calculated at the baseline assessment. Overall prevalence was estimated by determining the proportion of participants reporting any suicidal ideation at least once over the course of the 6-month follow-up. In preliminary exploration of the data, bivariate associations between

		Risk for Type II error.			the variables of interest and suicidal ideation were examined using prevalence ratios with and without adjustment for baseline depression (defined as PHQ-8 scores of 10 +) using a binary regression model. Forty participants (21.3%, 95% CI 15.7–28.8) reported suicidal ideation at least once over the course of the 6-month follow-up (6-month period prevalence). The 2-week period prevalence of suicidal ideation at baseline was 8.3% (95% CI 4.7–13.3). None of the demographic variables except age were associated with suicidal ideation. The pattern of association with age was non-linear, with elevated risk being restricted to the 65 and over age group. The unadjusted PR was 2.5 (95% CI 1.4–4.4) which, when adjusted for baseline depression (PHQ-8 of 10 +) symptoms, was 3.4 (95% CI 2.5–4.8).

Rating System for Hierarchy of Evidence

Level of Evidence	Type of Evidence
I (1)	Evidence from systematic review, meta-analysis of randomized controlled trails (RCTs), or practice-guidelines based on systematic review of RCTs.
II (2)	Evidence obtained from well-designed RCT and/or reports of expert committees.
III (3)	Evidence obtained from well-designed controlled trials without randomization.
IV (4)	Evidence from well-designed case-control and cohort studies
V (5)	Evidence from systematic reviews of descriptive and qualitative study
VI (6)	Evidence from a single descriptive or qualitative study
VII (7)	Evidence from the opinion of authorities

University of Maryland School of Nursing
Synthesis Table

Evidence Based Practice Question (PICO): Does implementation of depression screening tool (PHQ-9) and in adult Multiple Sclerosis patients to improve health-related quality of life compared to no screening?			
Level of Evidence	**# of Studies**	**Summary of Findings**	**Overall Quality**
I	**3**	Hind et al., (2016) conducted a metanalysis to determine the validity and reliability of self-report depression inventories in multiple sclerosis (MS) patients. Authors found that the reliability of the PHQ-9 ($n = 2$), internal consistency was good ($\alpha = 0.82$ with inter-item correlations of 0.35–0.67 (moderate to acceptable; item-total correlations were good for anhedonia (0.71), acceptable for depressed mood (0.65), and moderate for fatigue (0.57) and concentration (0.55) subscales. Patrick et al., (2019) conducted a systematic review to evaluate the psychometric properties of the 9-item Patient Health Questionnaires (PHQ-9) in MS patients. Study results support a cut-off score 11 on the depression screening yielded maximal pooled sensitivity (95%) and specificity (88.3%), PPV (51.4%), and NPV (48.6%). Qiuyan et al., (2019) conducted a metanalysis to evaluate the risk of suicide in multiple sclerosis patients. Author found that the association between suicide and multiple sclerosis was statistically significant with a pooled SRR 1.72 (95%CI 1.48–1.99, I-squared = 55.0%). Risk of suicide at diagnosis of multiple sclerosis (SRR 2.12, 95% CI 1.84–2.46; I-squared = 4.4%) was higher than the risk of suicide at symptom onset (SRR 1.69; 95% CI 1.43–2.00; I-squared = 0.0%). Authors suggested that this meta-analysis should be confirmed and extended in larger studies that consider potential ethnic and geographic factor.	A: Researchers were able to provide a consistent and generalizable review of the literature. Sample size (n=21) was adequate for literature review purposes. Selection of research articles and statistical analysis of selected outcome measures were rigorous; comprehensive; and definitive conclusions; and recommendations. A: Well-defined, reproducible search strategies; consistent results with enough numbers of well-defined studies; criteria-based evaluation of overall scientific strength and quality of Included studies and definitive conclusion A: Consistent and generalizable results. Sample size (n=21) was adequate. Definitive conclusions and recommendation. Recommendations were aimed at further research.
VI	**4**	Marrie et al;(2018) aimed to evaluate the validity and reliability of multiple screening measures for depression and anxiety for use in the clinical care of people with MS. In this study authors also mentioned that the PHQ-9 had the	B: No randomization, and no power analysis was reported to contextualize the adequacy of the samples, there is risk for type II error.

		highest sensitivity (84%) ranged from 93.8% to 95% and specificities ranged from 61.2% to 85.9%. However, they suggested that higher cut-points of PHQ-9 scores due to potential overlapping of MS symptoms with somatic symptoms of depression. In contrast, Sjonnesen et al; (2012) found that fatigue and concentration deficits do not invalidate the interpretation of the PHQ-9 when used in patients with MS. These items do not appear to make any substantial difference in the scale's performance in patients with MS when comparisons are made with the general population (odds ratio 2.17, p= 0.025) Viner et al; (2014) found that 21% of the MS patients reported suicidal ideation (suicidal ideation was assessed by using item 9 from the PHQ-9) at least once over the course of the 6 months follow up 95% Cl 15.7-28.8). Shorter duration of the study and small sample sizes are the weakness of the study. Dickstein et al; (2015) also support that the 9-item Patient Health Questionnaire (PHQ-9) is a well-validated instrument that is widely used to screen for depression. Item-9 of the questionnaire addresses the presence and persistence of recent thoughts of death or self-harm and has proved useful to screen for suicidal risk in primary care medical settings.	One study (Marrie et al;2018) is cross sectional studies. Weakness of the cross-sectional study, it does not provide with information about changes to the patient over time. One study (Dickstein et al; (2015); Sjonnesen et al; (2012); & Viner et al; (2014)) mentioned that depression, and fatigue are not included in this study. Additionally, most of the patients are treated disease modifying therapies (95%), there is possibility of selection bias. Recommendations were aimed at further research.

Educational and learning power point

Appendix B: Depression Screening: Administration and Documentation Lesson Plan

Learning Objectives	Learning Outline	Method of Instruction	Time Spent	Method of Evaluation
1. Discuss the significance of depression, depression's relationship to Multiple Sclerosis. 2. Understanding why screening, brief intervention, and referral to mental health provider are important for MS patients. 3. Demonstrate competence in the administration of the PHQ-9. 4. Become familiar with PHQ-9 flow sheet and how to score them 5. Demonstrate competence in documentation of the PHQs score and how to administer a brief intervention and referral to mental health if warranted.	1. Background and significance of depression in MS patients. 2. The sensitivity and specificity of the PHQs. 3. Eligibility for PHQ screening? 4. For medical assistants: How to administer the PHQs at Epic via using PHQ-9 flow sheet and when to give patients depression education handout 5. For MS providers: Review the score and how much PHQ-9 score warrants brief interventions and or referral to	Power Point Presentation	15 minutes	The project leader will assess learners' ability to demonstrate, step by step, of their competence on the PHQ Screening tool: 1. Ability to include/exclude the subjects as per protocol of the project (MAs). 2. Ability to screen the eligible patients using PHQ-9 and documentations of the scores in the EPIC (MAs). 3. Ability to use the score for management and referrals, if needed (MS Providers)
		Hands on Instructions (Step by step), aided by a pre-printed handout.	30 minutes	
		Guided Practice: After Hand on instructions, the Project Leader will enhance the trainee's understanding using real scenarios on PHQ scores of some patients (previously screened by the project leader).	20 minutes	

	mental health provider.			

Appendix C. Modified System Usability Scale (SUS)

		Strongly disagree				**Strongly agree**
1	I think that I would like to use this depression screening tool, brief interventions and referral as needed	1	2	3	4	5
2	I found the depression screening, treatment, and referral process was easy to use					
3	I found the depression screening, treatment, and referral process to be unnecessary and time consuming					
4	I think that I would need the support of the project leader to use the depression screening tool					
5	I found the various part of the depression screening, treatment, and referral process were well-integrated into the EMR.					
6	I thought there was too much inconsistency in this depression screening, treatment, and referral processes.					
7	I would imagine that most people would learn to use this depression screening and referral process very quickly.					
8	I found the depression screening, treatment, and referral process very cumbersome to use.					
9	I felt very confident using the depression screening and referral process.					
10	I needed to learn a lot of things before I could get going with his depression screening and referral process.					
Comments:						

Note. Per the Usabilty.gov website, text and documents are public domain, are not copyrighted, and may be copied and distributed if federal branding and loges are removed. This scale was modified from the System Usability Scale, by Usablity.gov. Retrieved from https://www.usabilty.gov/how -to-and -tools/methods/system-usabiity-sclae.html.

Using SUS

The SU scale is generally used after the respondent has had an opportunity to use the system being evaluated, but before any debriefing or discussion takes place. Respondents should be asked to record their immediate response to each item, rather than thinking about items for a long time.

All items should be checked. If a respondent feels that they cannot respond to a particular item, they should mark the center point of the scale.

Appendix D. Patient Health Questionnaire-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

For office coding: Total Score _____ = _____ + _____ + _____
Total Score _____
If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
Not difficult at all - Somewhat difficult - Very difficult - Extremely difficult

Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display, or distribute

Appendix E. PHQ-9 Scores and Proposed Treatment Options

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

Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display, or distribute.

Comments:

Appendix F. Data audit collection tool

Total number of MS patients seen in clinic	The number of patients is eligible for screening	The number of MS patients is screened for depression via PHQ-9	The number of patients with positive score (PHQ-9 >5) who are treated by MS providers	The number of patients with positive score (PHQ-9 >5) who are referred to mental health providers	Weekly mean depression screening score

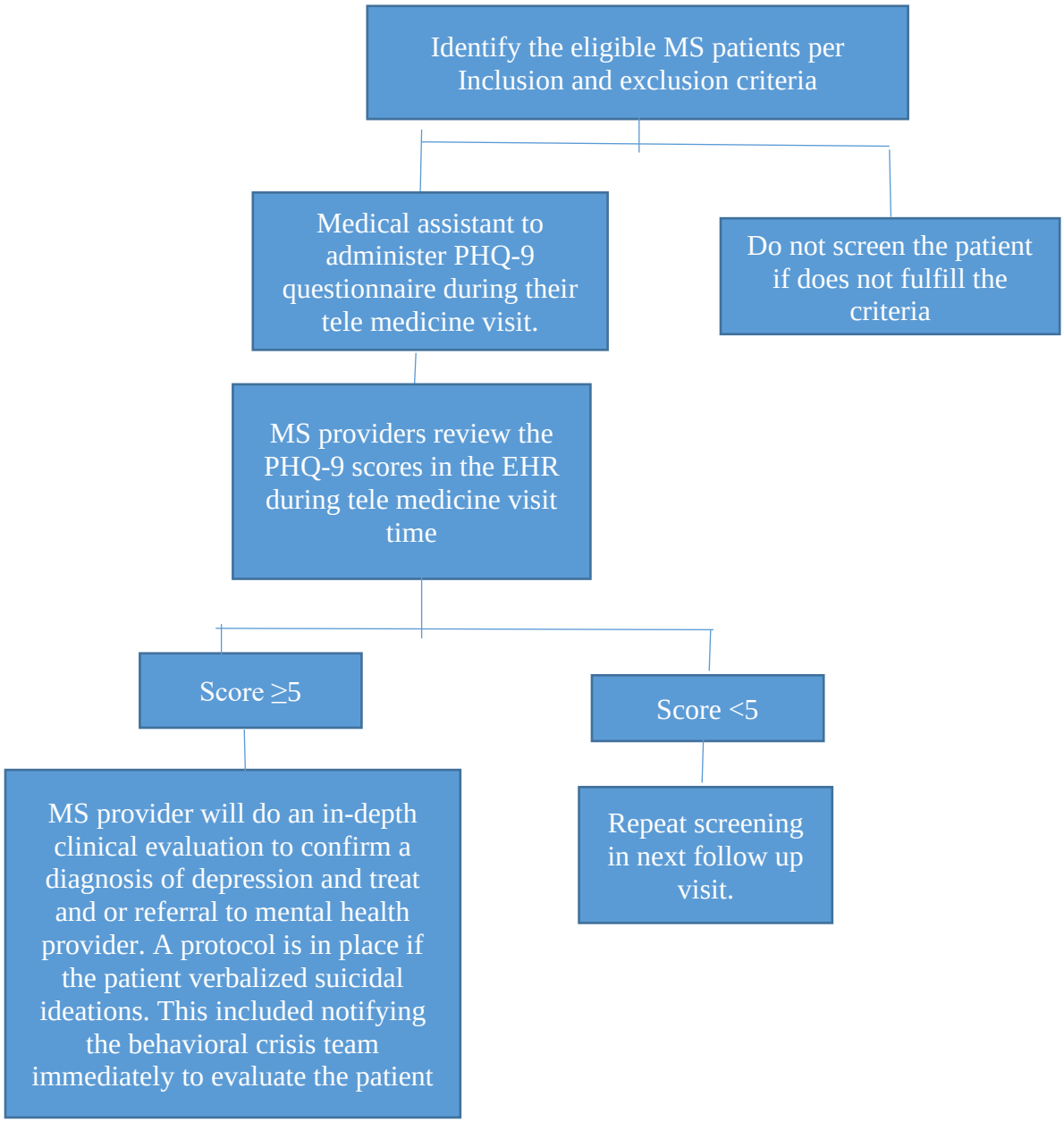
*Inclusion criteria: Diagnosed with MS according to the McDonalds criteria's, age > 18 years, English speaking, not severely cognitive and physical impairment.

*Exclusion criteria: No other neurological disease, Non-English speaking, severely impaired cognitively or physically, deaf, clinically diagnosed with Depression or taking Anti-depressant.

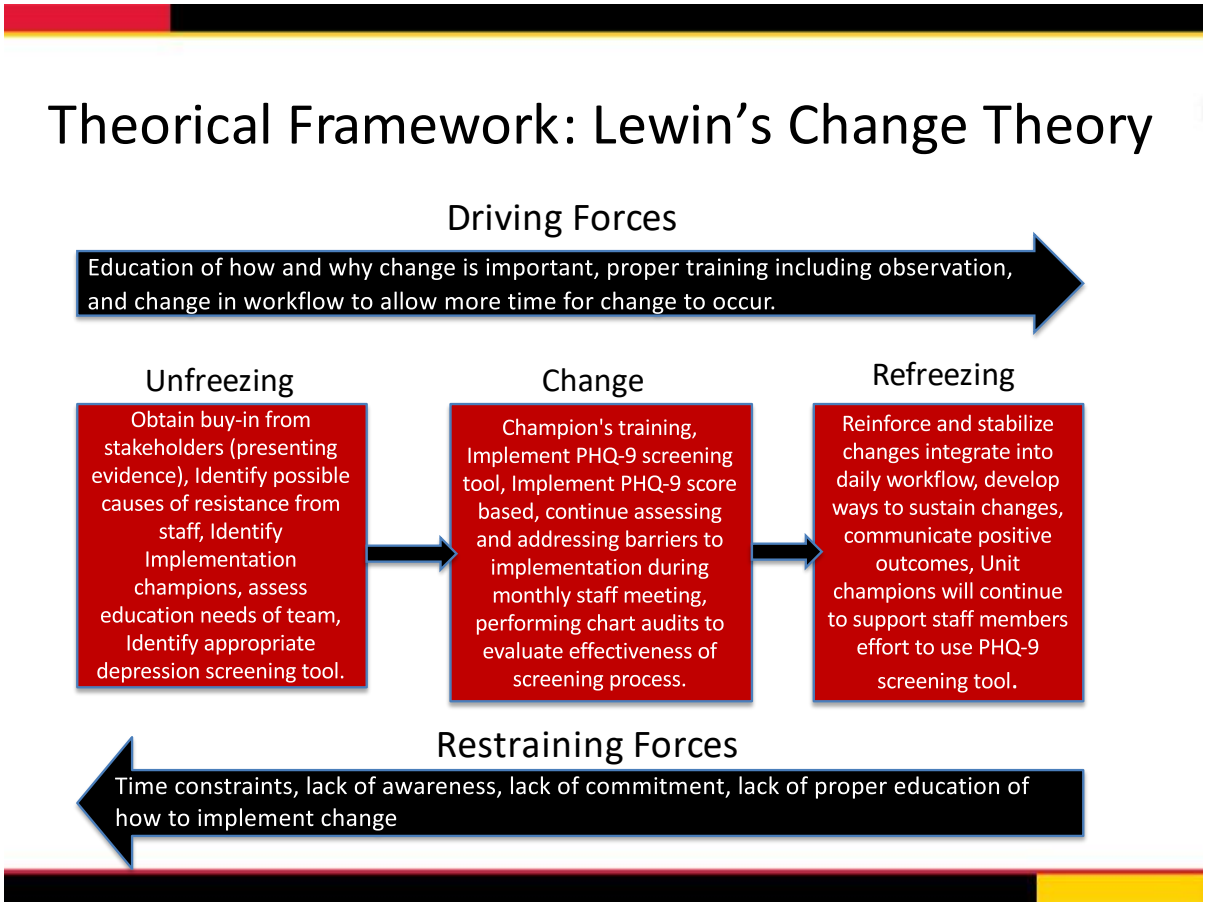
Appendix G. Depression Screening Procedures and Management Flow Sheet

*Inclusion criteria: Diagnosed with MS according to the McDonalds criteria's, age > 18 years, English speaking, not severely cognitive and physical impairment.

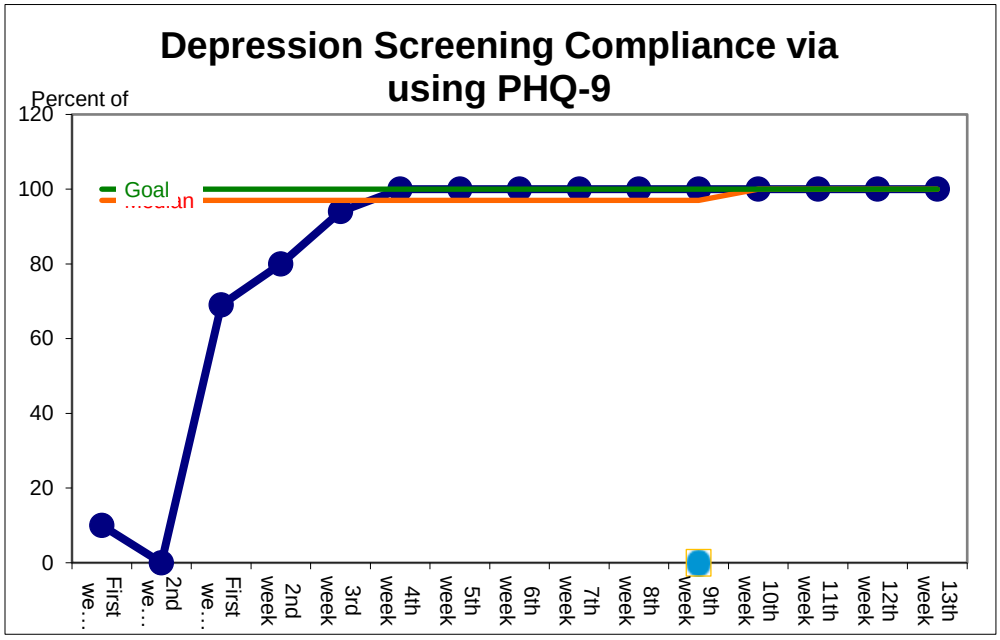
*Exclusion criteria: No other neurological disease, Non-English speaking, severely impaired cognitively or physically, deaf, clinically diagnosed with Depression or taking Anti-depressant.

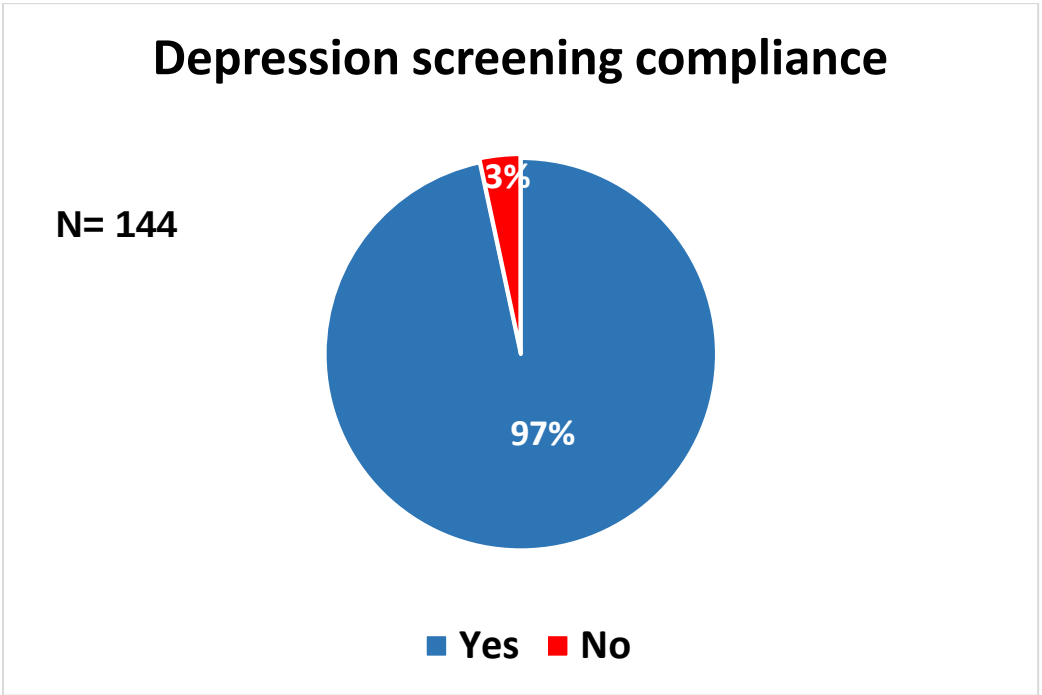


Appendix H. Theorical Framework: Lewin's Change Theory

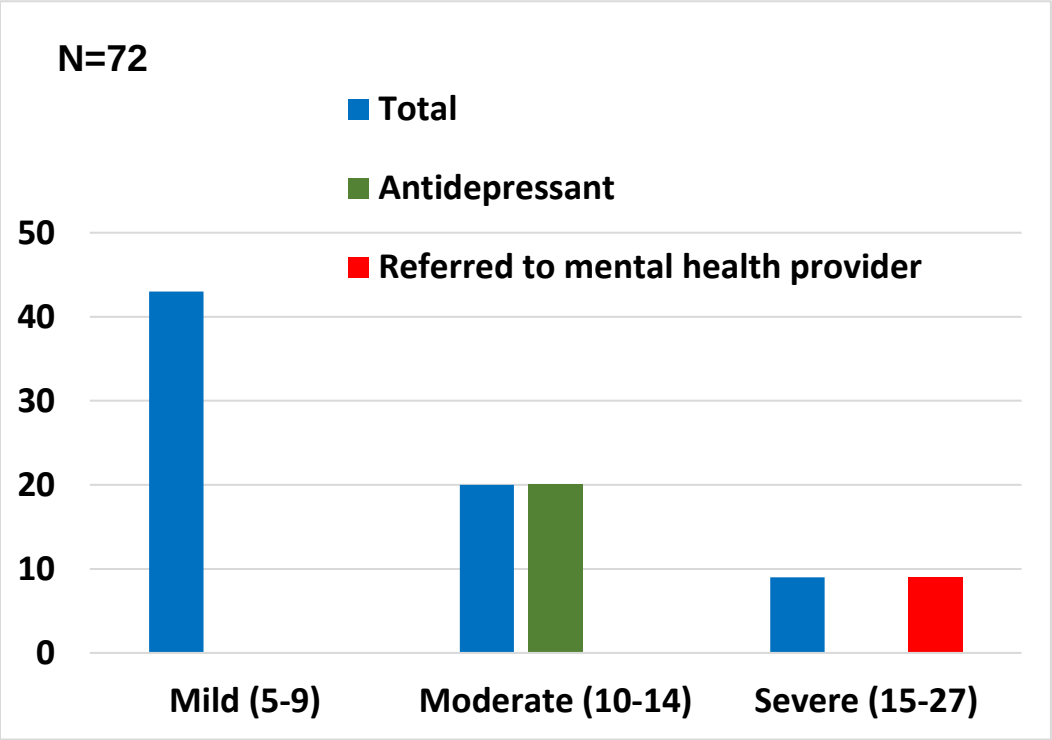


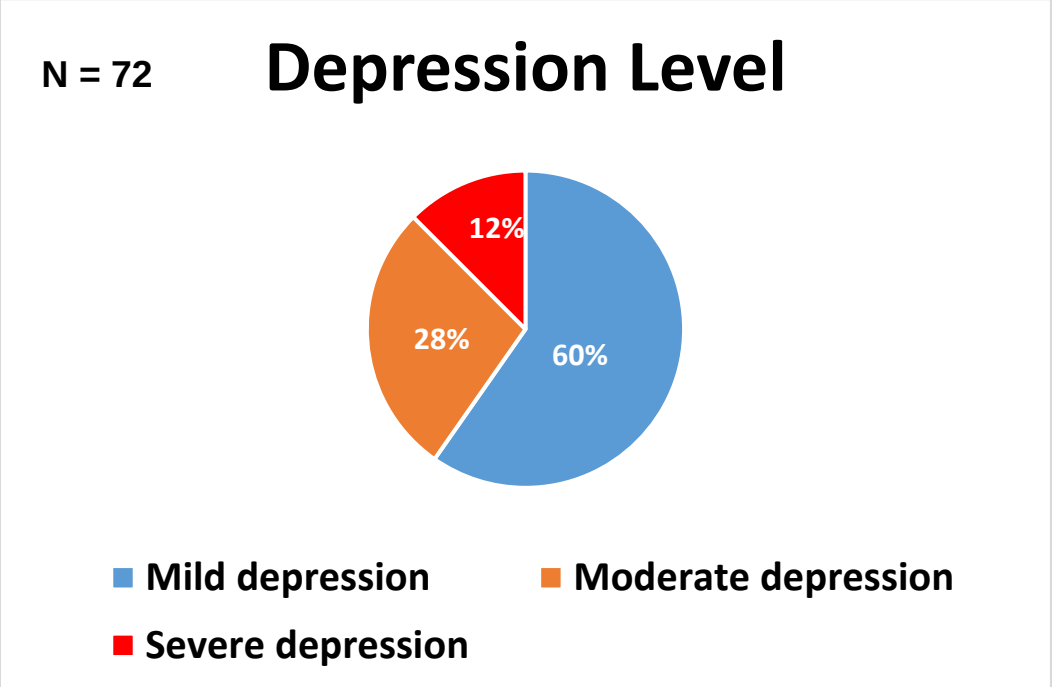
Appendix I. Results





Appendix J. Results





Appendix K. Patient Educational Handout Facts about Depression in MS patients:

- Depression is very common. Millions of people are suffering from depression in the United States.
- Depression is common among patients with MS. About 25-50 % of MS patients have depression.
- Undiagnosed and untreated depression in individuals with MS has been associated with increased anxiety, fatigue, pain, sleep disturbances, cognitive dysfunction, and poorer quality of life.
- Some MS medications and steroids can make depression symptoms.

Some common signs and symptoms of depression include:

- Feeling sad or irritable most of the day
- Loss of interest or pleasure in activities
- Significant weight loss or gain or a decrease or increase in appetite
- Sleeping too much or being unable to sleep
- Persistent fatigue or loss of energy
- Feeling worthless or guilty with no apparent cause
- Inability to concentrate or make decisions
- Recurrent thoughts of death or suicide

You may have all or only a few of these signs and symptoms. The hallmark of depression is that your symptoms persist, usually lasting at least two weeks.

Get help:

If you are depressed, do not wait to reach out for help. Talk to your primary care provider or a neurologist to determine appropriate next step. Your provider can assist you with your depression or refer you to mental health provider. If you are unable to make appointment with your provider in the next 2 weeks, you can call:

• Mental Health Association of Maryland at 410-235-1178 (www.mhamd.org)

• National Mental Health Association at 1-800-969-6642 (www.nmha.org)

These groups help people with depression or mental health problems.

If you have a thought or plan to hurt yourself or others, please call the following numbers or go to the nearest emergency room ASAP:

- Maryland Crisis Hotline (24/7): 800-422-0009
- Hope line Network (24/7): 800-784-2433
- 911

SAFETY PLAN:

We advise you to abstain from alcohol and other drugs of abuse.

For psychiatric emergencies prior to your initial outpatient appointment, you may dial 911, go to the nearest emergency room or contact one of the following:
Crisis Hotlines - (410) 531-6677 or 1-800-SUICIDE

BCRI - Baltimore Crisis Response Incorporated, (providers,24-hour -hotline, crisis beds, residential detox, and in-home mobile treatment teams)- (410) 752-2272 or (410) 433-5175, Detox (410) 433-5175

PES - Psychiatric Emergency Service at UMMS 22 S Greene Street, (410) 328-1219 or walk-in

CWIC - Crisis Walk in Clinic for Urgent Assessments at Sheppard Pratt, requires insurance, walk in to 6501 North Charles Street, Baltimore MD, Weinberg building Ask For "CWIC" (pronounced "Quick") (410) 938-5302
Website that links individuals with resources based on zip code:
http://www.mdcsl.org/search.html

OUTPATIENT PSYCHIATRIC RESOURCES THROUGH UMMS:

701 West Pratt Street Clinic - call for appointment (410) 328-6018. Accepts Medical Assistance (MA) and Medicare (MC). Uninsured individuals must apply for Medical Assistance and/or Pharmacy Assistance once they are enrolled.

PA Clinic - Psychiatry Associates. Takes private insurance but slots are limited (410) 328-5881

Fayette Street Clinic at 701 and Carruthers Clinic - call for appointment through the referral specialist, (410) 328-9621. Accept Medical Assistance (MA) and Medicare (MC). If MA or MC expired, you can return to these clinics if you have been seen there before. A very limited number of uninsured/Primary Adult Care

(PAC) individuals can be enrolled, but you must apply for Medical Assistance and Pharmacy Assistance (PA) prior to being seen. No private insurance accepted.

Department of Psychiatry Faculty Practice - for UMMS and state employees only, (410) 328-5881

Medical Crisis Counseling Center - for individuals and families coping with illness, private insurance, MA, MC, (410) 328-6091

Evelyn Jordan Center (EJC) HIV Psychiatry Program - for individuals with HIV, (410) 328-1900

Baltimore Mental Health Systems provides information referral for mental health Services in Baltimore 410-837-2647

OUTPATIENT PSYCHIATRIC RESOURCES OUTSIDE OF UMMS

Behavioral Health System - Baltimore - Information and referral line for substance use or mental health information treatment referral or other assistance (410) 637-1900

Johns Hopkins - SE Baltimore. (410) 955-0424

Johns Hopkins Bayview Community Mental Health Center - SE Baltimore. (410) 550-0104

Mosaic Community Services - Formerly known as "North Baltimore Center" in N Baltimore. 2225 North Charles Street, Baltimore (between 22 and 23rd street), 4th floor. Takes walk-ins between 9-12pm and 1 to 2:30 pm, serves the uninsured but must bring proof you have applied for insurance prior to being seen - (410) 366-4360 ext. 406

Baltimore Cares -- West Baltimore, takes PAC & Medical Assistance. (410) 233-3111

Healthcare for the Homeless - Downtown Baltimore, serves the uninsured, line up for walk-ins daily before 6 AM at 421 Falls way, Baltimore, (410) 837-5533

Pro Bono Counseling Services - Call for an initial 10-minute phone interview. After the interview, they will give you an initial appointment. Serves uninsured individuals. 410-825-1001.

Chase Brexton - Downtown Baltimore, serves uninsured and insured, (410)-752-0954 ext 1701

Sinai Hospital - NW Baltimore, (410) 601-5457

Harford Belair -NE Baltimore, (410) 426-5650

Sheppard Pratt - Towson (410) 938-5000 for everyone. If you have insurance, there are a very limited number of slots in Residents' Outpatient Clinic, (410) 938-4765

Key Point Health Services - Locations in Dundalk, Catonsville, Aberdeen, PAC, MA, MC. Does not accept private insurance, (443) 625-1590 or (443) 625-1600

Crisis Mental Health System -Baltimore County residents, outpatient referrals, 24-hour hotline, (410) 931-2214

SUPPORT AND EDUCATION FOR PATIENTS AND FAMILIES:

NAMI - National Alliance for the Mentally Ill, (410) 435-2600, http://nami.org

Family-to-Family - 12-week educational course for families coping with mental illness (410) 435-2600

Mental Health Association of Maryland - (410) 235-1178

Baltimore Health Care Access -- Addiction treatment and referral hotline (443) 451-4058

Alcohol and drug abuse administration of Maryland (410) 402-8600