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## Improving Mental Healthcare for Older Adults: Community Based Screening for Social and Emotional Loneliness and Major Depressive Disorder

Eunice Kowalczyk

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Improving Mental Healthcare for Older Adults:  
Community Based Screening for Social and Emotional Loneliness and Major Depressive  
Disorder  
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### Abstract

**Purpose:** Major depressive disorder (MDD) is a devastating mental health disorder affecting older adults that is often misdiagnosed or untreated due to a lack of screening and the stigma that MDD symptoms are a normal and expected part of aging. The goal of this quality improvement (QI) project was to implement a community-based screening intervention to identify community-dwelling older adults at risk for or suffering from MDD, and facilitate further evaluation and care.

**Methods:** Participants were community dwelling older adults, age 56 and older, in Massachusetts. Two screening tools were administered in two sites that screened for social and emotional loneliness and MDD, and follow-up was measured two weeks post initial interview. Quantitative methods including a Pearson-Chi-Squared test of independence and a One-Way ANOVA analysis were subsequently performed to analyze the data.

**Results:** Of the 53 participants, 4% scored positive for MDD, 22% scored positive for MDD and social and emotional loneliness, 28% scored positive for only social and emotional loneliness. A significant association was shown between MDD and social and emotional loneliness (Chi-Squared = 3.847,  $p=0.050$ ). 86% of participants that scored positive for MDD and 59% of participants that scored positive for social and emotional loneliness pursued further evaluation and social activities.

**Conclusion:** Implementation of early screening for MDD in older adults by psychiatric mental health nurse practitioners (PMHNP) through home visits can be effective at identifying MDD and its precursors, and facilitating further evaluation and interventions.

**Keywords:** older adults, advanced practice nursing, community-dwelling, depression, loneliness, screening tools.

Improving Mental Healthcare for Older Adults: Community Based Screening for Loneliness and  
Major Depressive Disorder

**Introduction**

Major depressive disorder (MDD) is the most common mental health disorder affecting older adults in the United States (U.S.) and worldwide (Polat, Kahraman, Kaynak, & Gorgulu, 2016). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), MDD is characterized by depressed mood and loss of interest or pleasure in daily activities for at least two weeks combined with weight loss, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, excessive guilt, difficulty concentrating, and/or thoughts of death or suicide for at least four weeks (American Psychiatric Association [APA], 2013).

Evidence shows that MDD in older adults can stem from pharmacological treatment side effects, effects of disease, and psychosocial stress due to limited social support, loss and prolonged bereavement, and low socioeconomic status, among others (Clark, Nicholas, Wassira, & Gutierrez, 2013; Kane, Ouslander, Resnick, & Malone, 2018; World Health Organization [WHO], 2017). Additionally, studies have shown that social isolation and loneliness can be precursors to or exacerbate existing symptoms of MDD (Liu, Gou, & Zuo, 2014; Qualter et al., 2015).

The WHO reports that the proportion of the world's population that are age 60 or older will double between 2015 and 2050. Currently, 7% of older adults worldwide have been diagnosed with depression, and these rates are expected to increase as this population lives longer (WHO, 2017). Furthermore, in the U.S., 10,000 adults join the age group of 65 and older every day and 15-20% of older adults are experiencing the symptoms of depression. Of those diagnosed with MDD, 2-4% live in a community setting, 10% report passive thoughts of suicide,

and 1% have active suicidal ideation (Centers for Disease Control and Prevention [CDC], 2016; CDC, 2017; Kane et al., 2018). In 2017, Massachusetts's (MA) average population of adults 65 and older (15.8%) exceeded the national average (15.2%) and is expected to increase to 21% by 2030 (United States Census Bureau, 2017). The rate of depression in older adults is also greater in MA (29%) in comparison to the national average (15%) (Dugan, Porell, & Silverstein, 2014; Hinkle, Brunner, Cheever, & Suddarth, 2014).

As the proportion of older adults increases within the population, the rate of depression also increases. Depression is currently the fourth largest health cost burden worldwide and is predicted to become the second largest by 2020 (Wang et al., 2017). In 2010, \$210.5 billion was spent in the U.S. on depression alone; this number includes costs related to treatment, suicide, and loss of revenue from decreased productivity in the workplace (CDC, 2016). Furthermore, the Massachusetts Department of Mental Health spent a total of \$722,152,000 in 2016 and is expected to increase their spending budget drastically each year to accommodate the growing burden of mental healthcare (Department of Mental Health, 2018). As a result of this growing cost burden, a shift in focus must occur from treating chronic mental health disorders to innovative approaches that prevent the development of mental health disorders altogether and ensure quality of life for older adults (CDC, 2017).

Furthermore, evidence shows that 85% of older adults with depression in the U.S. are left underdiagnosed or untreated. One major reason for this is the stigma among providers and patients that depressive symptoms in the older adults are a normal and expected reaction to the patient's age, illnesses, and life events (Kennedy-Malone, Fletcher, & Plank, 2014). This stigma surrounding mental health disorders such as MDD leads to a lack of early assessment and treatment of symptoms in older adults and can increase the risk for other health complications

such as cognitive impairment, disability, risk of falls, and suicidal ideation (Kiosses et al., 2017). Additionally, when left untreated, depression often complicates the management of other physiological problems including cardiovascular disease, diabetes, obesity, asthma, and cancer, thereby increasing healthcare costs and reducing quality of life (Kane et al., 2018).

Despite the stigma that depression is expected in older age, evidence shows that depression is not a normal part of the aging process; it is a debilitating mental health disorder and health care providers must have the skillset to assess and treat depression in older populations (CDC, 2017). Research indicates that early community-based screening is key in order to effectively prevent and treat MDD, and other mental health disorders, in older adults. Furthermore, the Community Preventive Services Task Force [CPSTF] (2014) and the CDC (2018) recommend the implementation of early screening for depression in order to identify individuals who are at risk for or already experiencing the symptoms of MDD, and to prevent further complications associated with the disorder (CDC, 2018; Yaka, Keskinoglu, Ucku, Yener, & Tunca, 2014). The purpose of this Quality Improvement (QI) Project was to implement early screening of social and emotional loneliness and MDD in community dwelling older adults in order to identify those at risk for or already experiencing the symptoms of MDD and who have been underdiagnosed, untreated, and/or are lacking access to assessment and treatment.

### **Review of the Literature**

A literature review was conducted to compare and contrast the reliability and validity of six screening tools that assess for cognitive function, loneliness, and MDD in older adults in community and home-based settings. A specific search strategy narrowed the articles for this literature review to studies of evidence-based models for preventive services in community settings using valid and reliable assessment tools when screening cognitive function, loneliness,

and MDD in older adults. An initial search was conducted using UMass Amherst's databases, such as The Cumulative Index to Nursing and Allied Health Literature (CINAHL), RefWorks, and PubMed, to find relevant articles published between 2013 and 2018. Keywords (*older adults, community-dwelling, depression, MDD, loneliness, cognitive function, screening tools, community settings, advanced practice nursing, and preventive services*) were used in different combinations to find studies within the search criteria. In addition, an ancestry search was conducted using reference lists of eligible studies. The inclusion criteria were individuals 55 years and older in various settings such as hospitals, homes, clinics, and community centers. The exclusion criteria were meta-analyses and studies in languages other than English.

With this criterion in mind, nineteen articles from 2013-2017 were selected for this review of the literature from an original list of 287 articles. Of the nineteen articles, two were Level I randomized controlled trials, one was a Level II quasi-experimental study, and sixteen were Level III cross-sectional studies. The level of evidence of these studies was determined using the Johns Hopkins Nursing Evidence-Based Practice: Research Evidence Appraisal Tool (Dang & Dearholt, 2017). These studies were completed in various global regions including Sweden, Finland, Japan, Germany, the U.S., Poland, Spain, Canada, Turkey, Brazil, the Netherlands, Denmark, and Italy. Furthermore, a matrix was created to guide the integrated review process, improve the rigor of the review, and include the strengths and limitations of the nineteen studies (Polit & Beck, 2012) (See Appendix A, Table 2).

### **Evidence-Based Practice Intervention**

In order to make informed clinical decisions when implementing this QI project, and improve mental healthcare for older adults living in the community, this literature review

compared and contrasted six evidence-based assessment tools that screen for cognitive function, loneliness, and depressive symptoms of MDD in older adults.

**St. Louis University Mental Status Examination (SLUMS) versus Mini-Mental Status Examination (MMSE).** Evidence shows that the SLUMS scale is a reliable and valid assessment tool and is superior to the MMSE scale when assessing cognitive function in older adults (Buckingham, Mackor, Miller, Pullman, & Molloy, 2013; Feliciano et al., 2013; Kaya et al., 2016; Yoelin & Saunders, 2017). The SLUMS scale is easier to administer and screens for different domains of cognition in a shorter time period than the MMSE. Additionally, the SLUMS scale is more reliable than the MMSE in terms of psychometrics because its measurements are more sensitive and less likely to miss a case of dementia (Buckingham et al., 2013; Kaya et al., 2016; Yoelin & Saunders, 2017).

Furthermore, the SLUMS scale was designed to be more accurate than the MMSE by taking education level of the individual into account and adjusting the scores accordingly (Yoelin & Saunders, 2017). The SLUMS scale has been shown to be consistently reliable when screening individuals from different backgrounds, genders, cultures, and languages. Although the MMSE is the most widely used tool amongst health care providers when assessing cognitive function, evidence shows that the SLUMS scale is more accurate at detecting cognitive impairment when screening for cognitive function in older adult populations (Feliciano et al., 2013; Kaya et al., 2016; Yoelin & Saunders, 2017).

**De Jong Gierveld Loneliness Scale 11-item (DJGLS-11) versus University of California, Los Angeles Loneliness Scale (UCLA).** Research indicates a significant association between loneliness and negative health outcomes, such as MDD (Lasgaard, Friis, & Shevlin, 2017). The two most widely used tools for assessing loneliness are the DJGLS-11 and the

UCLA, though evidence shows that the DJGLS-11 is more accurate and reliable than the UCLA when assessing older adults for loneliness (Penning, Liu, & Chou, 2014). Several studies indicate that the DJGLS-11 is a valid and reliable screening tool for the assessment of older adults for social and emotional loneliness. The DJGLS-11 is also reliable and consistent when translated into other languages and is culturally sensitive among diverse populations (Grygiel, Humenny, Rebisz, Switaj, & Sikorska, 2013; Tomás, Pinazo-Hernandis, Donio-Bellegarde, & Hontangas, 2017; Uysal-Bozkir, Fokkema, MacNeil-Vroomen, van Tilburg, & de Rooij, 2017).

Additionally, the UCLA focuses only on social loneliness while the DJGLS-11 assesses both social and emotional loneliness. Assessing for both social and emotional loneliness differentiates between the impact of personality and social/cultural factors on an individual's level of loneliness. This is essential for designing an effective intervention that targets the specific influencing factors on an individual's level of loneliness (Buz, Urchaga, & Polo, 2014). Therefore, the DJGLS-11 provides effective results that can be used to tailor an individual's evidence-based care.

**Patient Health Questionnaire 9-item (PHQ-9) versus Geriatric Depression Scale 15-item (GDS-15).** There are a variety of screening tools available to assess and measure depressive symptoms. The PHQ-9 and the GDS-15 both have diagnostic accuracy for the identification of major depressive episodes in older adults and both tools can either be administered by a clinician or completed by the client in 3-5 minutes (Chiesi et al., 2017b; Conradsson et al., 2013; Costa et al., 2016). The GDS-15 was designed specifically for the assessment of MDD in older adults, whereas the PHQ-9 can assess MDD in adults of all ages (Beard, Hsu, Rifkin, Busch, & Bjorgvinsson, 2016; Costa et al., 2016). Although it was designed for the general population, evidence shows that the PHQ-9 is valid and reliable when assessing MDD in patients 60-92

years of age (U.S. Preventative Services Task Force [USPSTF], 2018; Costa et al., 2016). There is no significant difference between the accuracy of the PHQ-9 and the GDS-15, and both tools are unbiased when screening individuals of varying age, gender, and background for MDD (Beard et al, 2016; Chiesi, et al., 2017a; Conradsson et al., 2013; Costa et al., 2016; Kocalevent, Hinz, Brahler, 2013; Midden & Mast, 2017).

Despite the similarities between the PHQ-9 and the GDS-15, the PHQ-9 is the more effective screening tool when assessing older adults for MDD. The PHQ-9 consists of fewer questions than the GDS-15 and therefore is easier to administer to older adults; it also provides a more straightforward assessment than the GDS-15 (Beard et al., 2016; Costa et al., 2016). The scores of the PHQ-9 are more specific in regard to the severity of depressive symptoms and include five possible severity scores (minimal, mild, moderate, moderately severe, and severe) as opposed to the three severity scores of the GDS-15 (no depression, mild depression, and severe depression) (Beard et al., 2016). Additionally, question nine on the PHQ-9 screens specifically for suicidal ideation and can indicate if immediate intervention is needed for an individual (Inagaki et al., 2013; O'Riley et al., 2015).

The findings from this review of literature conclude that the SLUMS, DJGLS-11, and PHQ-9 are the most valid and reliable assessment tools for screening cognitive function, loneliness, and MDD in community-dwelling older adults. (Beard et al, 2016; Costa et al., 2016; Feliciano et al., 2013; Kaya et al., 2016; Penning et al., 2014; Yoelin & Saunders, 2017). Furthermore, evidence shows that these three assessment tools are unbiased when screening older adults of varying gender, culture, and background (Beard et al, 2016; Costa et al., 2016; Grygiel et al., 2013; Kocalevent, Hinz, Brahler, 2013; Tomas et al., 2017; Uysal-Bozkir et al., 2017; Yoelin & Saunders, 2017).

Additionally, the SLUMS, DJGLS-11, and PHQ-9 are easy to administer, easily understood, and an appropriate length for older adults, which decreases the burden on participants who may have limited energy and ability (Costa et al., 2016; Kaya et al., 2016; Uysal-Bozkir et al., 2017). However, there is a gap in this review, given the lack of a randomized approach in a majority of the studies and the limited number of studies within the U.S. Therefore, more studies need to be conducted that screen older adults in the U.S. using these three assessment tools in order to provide further evidence of the effectiveness of this intervention.

### **Evidence Based Practice**

Evidence shows that MDD can be prevented and managed successfully when older adults are screened and identified early in community and home-based settings (USPSTF, 2016). Implementing the SLUMS scale helps rule out individuals who are experiencing dementia in order to ensure the accuracy of the DJGLS-11 and PHQ-9 screening results and the rigor of the QI project (Costa et al., 2016; Inagaki et al., 2013).

Furthermore, evidence shows that pre-screening for loneliness should be implemented when screening for those at risk for MDD due to the fact that loneliness is a precursor for depression, anxiety, and suicidal ideation (Buz et al., 2014; Lasgaard et al., 2016). Screening for social and emotional loneliness can also help identify whether existing MDD symptoms are attributed to physiological disease (e.g. cardiovascular disease, cancer, Parkinson's disease, stroke, lung disease, arthritis, loss of hearing, dementia, etc.) or a psychosocial issue (e.g. social isolation, living alone, lack of financial resources, lack of social interaction, etc.) (Kane et al., 2013). Implementing community and home-based early screening of MDD using SLUMS, DJGLS-11, and PHQ-9 can effectively identify the presence of MDD and its influencing factors,

which can be used by the psychiatric mental health nurse practitioner (PMHNP) to create a tailored evidence-based intervention (Beard et al, 2016; Buz et al., 2014; Costa et al., 2016; Pizzi et al., 2014; Yoelin & Saunders, 2017).

## **Theoretical Framework**

### **Theory of the Interpersonal Relations**

Hildegard Peplau's middle-range Theory of Interpersonal Relations was used as a framework when implementing this QI project. The crux of Peplau's theory resides in the provider-patient relationship. The healthcare provider possesses the skillset and expertise, while the patient possesses the desire to alleviate suffering and explore potential solutions to their problems, which will consequently improve their quality of life (McEwen & Wills, 2014; Varcarolis & Halter, 2018) (See Appendix B). For the purposes of this QI project, the PMHNP-DNP student brought her knowledge and expertise to assess community-dwelling older adults for symptoms of MDD. Project participants sought an understanding of their problems, further evaluation to diagnose and treat the symptoms of MDD, and ways to engage socially with their community to reduce their loneliness and increase their quality of life.

Furthermore, Peplau proposed that patient outcomes depend heavily on the interactions that take place between the healthcare provider and patient. This relationship ultimately facilitates progress towards a positive outcome, as well as reinforces a strong foundation in independent problem solving. Peplau's model of interpersonal relations consists of four interlocking phases: pre-orientation phase, orientation phase, working phase, and termination phase (McEwen & Wills, 2014; Varcarolis & Halter, 2018) (See Appendix B).

**Pre-orientation phase.** This phase takes place prior to the initial meeting between the health care provider and patient. This stage serves as an opportunity for the mental healthcare

provider to both acknowledge and assess their own feelings, thoughts, concerns, biases, and limitations regarding their patient (McEwen & Wills, 2014; Varcarolis & Halter, 2018).

**Orientation phase.** The orientation phase serves as the initial contact between healthcare provider and patient. It is during this crucial phase that rapport is established, confidentiality is discussed, and roles, as well as overall expectations, are clearly defined. Self-awareness is critical during this stage, as it acknowledges the differences in background, standards, experiences, and values between provider and patient. This ultimately helps to cultivate a reassuring atmosphere in which rapport can grow and a meaningful provider-patient relationship can be fostered. As a result, patient problems become clearly identified, and treatment and assessment goals are thoughtfully discussed (McEwen & Wills, 2014; Varcarolis & Halter, 2018).

**Working phase.** The primary objective of this stage is to allow the patient to develop new and adaptive coping behaviors in the safe atmosphere and setting that was cultivated in the previous stages. The working phase serves to reinforce the already developed provider-patient rapport, as well as obtain additional data, and assist the patient in overcoming resistant behaviors. Additionally, this stage serves as an opportunity for the healthcare provider and patient to create new benchmarks as well as adjust existing goals (McEwen & Wills, 2014; Varcarolis & Halter, 2018).

**Termination phase.** This serves as the final stage of Peplau's interpersonal relations model. During this phase, goals and objectives are summarized by both the health care provider and patient, and a plan for moving forward is established. Both parties may also exchange memories, which not only validates the experience, but serves as a means of establishing closure (McEwen & Wills, 2014; Varcarolis & Halter, 2018).

### **Project Design**

This QI project was a post-evaluation design. Two close-ended and one open-ended questionnaire scales were implemented to screen for cognitive function, social and emotional loneliness, and MDD in older adults at a free medical clinic and low-income older adult residence. The assessment tools used to assess participants in this quality improvement project were implemented in the following order:

- SLUMS measured cognitive function with scores of Normal Cognitive Function, Minor Neurocognitive Disorder, and Dementia. SLUMS was administered to all participants to determine levels of cognitive function in order to exclude those scoring for Dementia from the QI project (Yoelin & Saunders, 2017) (See Appendix E).
- The participants who scored for Normal Cognitive Function or Minor Neurocognitive Disorder were then administered the DJGLS-11, which measured overall emotional and social loneliness. The DJGLS-11 tool scored participants on a severity scale ranging from Not Lonely, Moderate, Severe, and Very Severe Loneliness. (Tanner, Martinez, & Harris, 2014) (See Appendix F).
- All of the participants who were administered the DJGLS-11 were also administered the PHQ-9. The PHQ-9 assessed depressive symptoms in participants with scores of MDD, other DD, and No Depressive Disorder. Scores also indicated depression severity of Minimal Depression, Mild Depression, Moderate Depression, Moderately Severe Depression and Severe Depression (Spitzer, Williams, & Kroenke, 1999) (See Appendix G).

There was no capital investment for this QI project, but there were monetary costs, including printing for educational material, registration forms, etc. An estimated budget for this QI project is included in the Appendix (See Appendix C, Table 3).

## **Methods**

This QI project was implemented at a free medical clinic and a low-income residence for older adults in Shrewsbury, MA. The free medical clinic was an ideal and cost-effective setting due to the existing space and utilities already offered by this facility. The clinic was staffed by highly qualified volunteer physicians and nurse practitioners who were supportive of the QI project. Additionally, the free medical clinic served approximately 60-100 patients weekly, many of whom were older adults that visited the clinic with the signs and symptoms of depression. Finally, the hall connecting the clinic and the adjacent church was a comfortable space for community members as it had been used for both health care and recreational activities, such as lunches, card games, and birthday parties.

The low-income residence housed approximately 100 low-income older adult residents. This location provided a connection to older adults in the community that lived alone, had lost a spouse, and/or may have been experiencing other precursors to MDD. Furthermore, many residents had limited access to mental healthcare due to their low socio-economic status, mobility issues and lack of transportation, and hesitation to be screened in a healthcare facility for MDD due to the stigma surrounding mental health disorders.

Project participants included community dwelling adults, age 55 and older, who sought care at the free medical clinic or resided at the low-income older adult residence. This age range was chosen to include both older adults and adults nearing the age of 65 in order to identify those at risk for or already experiencing symptoms of MDD and prevent further development of the

disorder and its consequences later in life. The participants were recruited through pamphlets and advertisements distributed throughout the two project sites. A majority of the participants at the low-income older adult residence were non-Hispanic white, while there was a higher diversity of culture and race among participants at the free medical clinic. Furthermore, a majority of the individuals visiting the free medical clinic did not have health insurance or an established PCP, while most of the participants at the low-income older adult residence had some form of health insurance and PCP and mental health care provider. Participants who scored positive for dementia using the SLUMS assessment tool were excluded from participating in the remainder of the QI project and a family member or healthcare proxy was contacted with a recommendation for follow-up evaluation.

### **Data Collection Procedure**

This QI project process began in June 2018 by presenting the project to potential sites, with implementation occurring from October 2018 to February 2019, while results of the project were presented April 2019. This QI project was completed in four phases: pre-orientation phase, orientation phase, working phase, and termination phase (Varcarolis & Halter, 2018).

**Pre-Orientation Phase.** The pre-orientation phase, June 2018-September 2018, involved contacting the stakeholders of the two project sites and presenting the QI project for implementation approval. A form was completed and submitted to the UMass Amherst IRB for review. The IRB determined that this QI project was Human Subjects Research and further IRB approval was required. Educational meetings were held over the course of the pre-orientation phase with the QI project site stakeholders and volunteers to inform them of the risks and consequences of undiagnosed MDD and the details of the project such as project goals,

participant confidentiality, and data storage. Additionally, the QI team was assigned project tasks such as advertisements, pamphlet distribution, etc.

**Orientation Phase.** The orientation phase, October 2018-January 2019, included the recruitment of participants through the distribution of pamphlets and advertisements at the two project sites. Evidence shows that a combination of early screening and education regarding MDD can increase access to mental health care and treatment compliance (Oyama & Sakashita, 2016). Therefore, an educational meeting was held in October 2018 with potential project participants to introduce the QI project and educate attendees about the risks, stigma, signs, and symptoms of MDD. Participants who were recruited after this educational meeting received the same information on an individual basis. After joining the project informed consent forms were signed and collected from participants. Furthermore, stakeholders from both sites were engaged throughout project implementation. The stakeholders, the DNP student, and volunteers of this QI project were engaged by meeting monthly to maintain coordination between all members and keep everyone updated (See Appendix D, Table 4, for detailed positions and responsibilities).

**Working Phase.** Three assessment tools were implemented at the QI project sites during the working phase from October 2018-February 2019. Each participant was first assessed by the PMHNP-DNP student, and assisted by a pre-medical student and a registered nurse, for cognitive function using the SLUMS scale. Participants who scored positive for dementia were excluded from the remainder of the QI project and family members or a healthcare proxy were contacted with a recommendation for further evaluation and diagnosis. Participants who did not score for dementia were then assessed for social and emotional loneliness using the DJGLS-11 and for depressive symptoms using the PHQ-9.

Immediately following the assessment tool implementation, the assessments were scored and results were given to participants. Participants who scored positive for MDD had a letter of results sent to their PCP or mental health care provider, with participant authorization, for further evaluation and diagnosis beyond the completion of this QI project. Additionally, all participants, regardless of scores, were connected to resources and social activities in the community to reduce social and emotional loneliness and other precursors to MDD. Two weeks after the results were given to participants, they were contacted in person and an inquiry was made to measure their follow-up action in regard to contacting their healthcare provider and/or engaging with the provided community resources and activities. A safety plan was created to respond to indications of suicidal ideation from participants during the implementation of the three assessment tools.

**Termination Phase.** The termination phase of this QI project occurred February 2019-April 2019 and began with analysis of the project data. Additionally, educational meetings were held in April 2019 with participants, stakeholders, and volunteers to present the results of the project and review the importance of early screening and treatment of MDD. Finally, in May 2019, the results of this QI project were presented to the University of Massachusetts Amherst College Of Nursing with plans for submission to be published (Journal TBA).

### **Data Analysis Procedure**

This QI project used quantitative methods to analyze the data gathered from two assessment tools, DJGLS-11 and PHQ-9, and the follow-up inquiry (Polit & Beck, 2012). The number of participants that were not previously diagnosed were compared to the number of participants that scored positive for MDD and emotional and social loneliness in order to identify participants that are underdiagnosed and untreated. Additionally, the number of participants who pursued follow up action, either through further assessment with their PCP or mental health care

provider or by participating in the provided community activities (Gold's Zumba classes, men's exercise group, Sunday coffee socials), were compared to the number of participants who did not pursue follow up action in order to evaluate the effectiveness of the early screening intervention. Participants were grouped into six categories depending on the presence of MDD, social and emotional loneliness, and other depressive disorder (DD) symptoms. Subsequently, further and more descriptive analyses were performed using a Pearson Chi-Squared test of independence, and a One-Way Analysis of Variance (ANOVA) in SPSS software (Version 25.0), and a p-value less than 0.05 was considered to indicate a significant statistical difference (IBM Corporation, 2017).

### Goals, Objectives, and Expected Outcomes

The goals, objectives, and expected outcomes for this QI project are presented in Table 1.

Table 1		
<i>Goals, Objectives, and Expected Outcomes</i>		
<u>Goals</u>	<u>Objectives</u>	<u>Expected Outcomes</u>
<b>Pre-Orientation Phase:</b> Educated project site stakeholders and volunteers about MDD and social and emotional loneliness, the assessment tools, and the goals of the project.	Educational meetings were held at each project site in September 2018 with outreach coordinators, volunteers, and stakeholders.	At least 75% of project stakeholders and volunteers would attend the meetings in September 2018 and become educated about the QI project.
<b>Orientation and Working Phase:</b> Participants were recruited and screened for cognitive function (SLUMS scale), social and emotional loneliness (DJGLS-11), and depression (PHQ-9).	Recruit participants from October 2018 to January 2019 through pamphlets and other advertisements. Screen participants from October 2018 to February 2019 at each of the QI project sites.	Approximately 50 older adults would be reached during recruitment and would be screened for cognitive function, social and emotional loneliness, and depression between October 2018 and February 2019.
<b>Working Phase:</b> Participants that scored positive for MDD were educated about MDD and its consequences, and	Participants who scored positive for MDD between October 2018 and February 2019 were given information	At least 75% of participants who scored positive for MDD would follow-up with their PCP or mental health care

<p>were recommended for follow-up with their PCP or mental health care provider for further evaluation and diagnosis.</p>	<p>about MDD and its consequences on an individual basis when they received their results. Letters were sent to their PCP or mental health care provider with their results for further evaluation.</p>	<p>provider between October 2018 and February 2019 for further care.</p>
<p><b>Working Phase:</b> All participants, regardless of scores, were connected with community resources and social activities.</p>	<p>Participants were informed about community resources and upcoming social activities, and were given help to register, from October 2018 to February 2019.</p>	<p>At least 50% of participants would show interest in connecting with community resources and social activities between October 2018 and February 2019.</p>
<p><b>Termination Phase:</b> The QI project results were presented to participants, stakeholders, and volunteers in April 2019.</p>	<p>Educational meetings were held with participants, volunteers, and stakeholders in April 2019 to present the results of the project.</p>	<p>At least 75% of participants would authorize having their results presented. At least 75% of participants, stakeholders, and volunteers would attend the meetings in April 2019.</p>

**Ethical Considerations/ Protection of Human Subjects**

Before implementing this QI project, the Human Subjects Determination form was submitted to the UMass Amherst Institute Review Board (IRB) for review and approval. The IRB determined that this QI project was a Human Subjects study and further approval was obtained through expedited review by the IRB. The rights of project participants were protected by maintaining anonymous and confidential data. Confidentiality was maintained throughout the project by keeping individuals’ records nameless and facilitating anonymity by using code numbers for individuals’ identities in order to prevent others from linking reported information to them. The QI team kept all records, including a master list of participant names and codes, in a secure location on the UMass Amherst server within Box.com and the computer hosting

electronic files were password protected. The master list will be destroyed within three years of the conclusion of the research study.

Participants were informed that the only time confidentiality would be breached is if they were in danger of hurting themselves or others. Names of the subjects were not used in any reports or publications. Individuals were assured that their information would not be shared without their authorization. The participants willingly and voluntarily signed consent forms to participate in the QI project, and individuals were informed that they could withdraw from the project at any time (U.S. Department of Health and Human Services, 2008). Participants were informed that data presented to the stakeholders and volunteers from the two project sites and published in a scholarly journal would be at the aggregate level and individual results would not be presented.

### **Results**

A total of 55 participants were screened for MDD and social and emotional loneliness, of which two participants were excluded due a positive score for cognitive impairment (dementia) and whose results were thus removed from analysis for failing to meet project requirements. The remaining 53 participants were included in the results of this QI project, 29 of which were screened at the free medical clinic and 24 of which were screened at the low-income older adult residence. Out of the 53 participants, 32 were female and 21 were male, ranging from ages 56 to 89. Additionally, no participants indicated suicidal ideation during the assessment implementation and no emergency action needed to be taken.

When screened for social and emotional loneliness and MDD, 4% of participants scored positive for only MDD, 22% scored positive for MDD and social and emotional loneliness, 28% scored positive for only social and emotional loneliness, 5% scored positive for other depressive

disorders (DD) without social and emotional loneliness, 13% scored positive for other DD and social and emotional loneliness, and 28% scored negative for MDD and social and emotional loneliness (See Appendix H, Figure 1). Additionally, 86% of participants who scored positive for MDD had never been previously diagnosed with the disorder. The other 14% of participants had previously been diagnosed with MDD and were still experiencing the signs and symptoms of the disorder (See Appendix H, Figure 2). Participants verbally identified bullying and harassment among residents, financial hardship, and lack of transportation as factor contributing to their isolation and feelings of loneliness.

Out of all participants who scored positive for MDD, the percentage of participants scoring positive for both MDD and social and emotional loneliness (86%) was higher than the percentage of participants scoring only for MDD (14%), and a significant association was shown between MDD and social and emotional loneliness (Chi-Squared=3.847,  $p=0.050$ ) (See Appendix H, Figure 3 & Appendix I, Table 5). Furthermore, there was a significant difference when comparing the number of participants that had been previously diagnosed with MDD to the number of participants that scored positive for MDD and social and emotional loneliness ( $F=7.891$ ,  $p=0.007$ ) (See Appendix I, Table 6).

When comparing the two project sites, the data showed no significant difference between the number of participants who scored positive for MDD ( $F=1.061$ ,  $p\text{-value} = 0.308$ ) (See Appendix I, Table 7). However, there was a significant difference in participants who scored positive for social and emotional loneliness between the two project sites, with those at the low income older adults residence experiencing greater rates of social and emotional loneliness compared to those at the free medical clinic ( $F=7.784$ ,  $p\text{-value}=0.007$ ) (See Appendix I, Table 7).

Furthermore, 86% of participants who scored positive for MDD followed up with their PCP or mental healthcare provider for further evaluation (See Appendix H, Figure 4). The data showed no significant difference between the two project sites in terms of participants who sought follow-up for MDD ( $F=2.020$ ,  $p\text{-value}=0.161$ ) (See Appendix I, Table 8). Of all participants that scored positive for social and emotional loneliness, 59% pursued follow-up action by signing up for the provided activities available in the community (See Appendix H, Figure 5). There was no significant difference between the two project sites among participants who sought community activities after a positive score for social and emotional loneliness ( $F=0.031$ ,  $p\text{-value}=0.862$ ) (See Appendix I, Table 9).

### **Discussion**

The theoretical framework guiding this QI project, Peplau's Theory of Interpersonal Relations, facilitated and influenced the QI project results throughout the four implementation phases. Additionally, Peplau's Theory of Interpersonal Relations fostered trusting PMHNP-DNP student-participant relationships, helped participants gain personal insight regarding MDD and social and emotional loneliness, promoted participant autonomy and empowerment, and encouraged positive decision-making and follow-up action based on assessment scores (McEwen & Wills, 2014; Varcarolis & Halter, 2018).

The results of the QI project indicated that a significant percentage of the community-dwelling older adult participants that scored positive for MDD were underdiagnosed and/or untreated. Additionally, these findings showed that many individuals who had been previously diagnosed with MDD and were receiving treatment, continued to experience symptoms associated with this disorder, suggesting that these participants were receiving inadequate treatment for the symptoms of MDD. Furthermore, the results of this QI project showed a strong

association between social and emotional loneliness and MDD. This finding suggested that the development of MDD may be prevented or improved by directly addressing the causes of social and emotional loneliness identified by participants, such as financial hardships, lack of transportation, and bullying and harassment amongst peers.

When comparing the participants screened at the two project sites, a significantly higher percentage of participants at the low-income older adult residence scored positive for social and emotional loneliness than those at the free medical clinic. Participants at the low-income older adult residence may have scored significantly higher for social and emotional loneliness because they had less social supports than the participants who lived in the community and used the free medical clinic. The lower prevalence of social and emotional loneliness among participants at the free medical clinic would indicate that the prevalence of MDD among these participants would also be significantly lower than the low-income older adult residence. However, when comparing participants at the two project sites, there was no significant difference between the number of participants that scored positive for MDD. A possible contributing factor is that most of the participants at the free medical clinic had no health insurance or established primary care physician, and therefore no access to mental health care and MDD treatment.

Additionally, this QI project identified a group of participants who did not score positive for MDD, but rather scored positive for other DD. This further supports the need for PMHNPs to create and implement home-based mental healthcare models in order to identify individuals experiencing or at-risk for MDD and other DD. Early intervention can prevent complications of many mental health disorders, and PMHNPs are highly qualified mental healthcare professionals that have the comprehensive skillset necessary to assess and screen for mental health disorders, such as MDD, and their precursors (Joel, 2018). When entering an older adult's environment to

screen for MDD, PMHNPs have the knowledge and ability to identify underlying social, environmental, and other problems that can be addressed in order to prevent further deterioration of the individual's mental health and to maximize their quality of life (Joel, 2018). For example, a participant in this QI project with multiple co-occurring health problems, a lack of financial resources, and limited social support, had served in the U.S. Navy for many years and had not registered with Veterans Affairs (VA). As a result, this participant had not been receiving any support from this resource. Implementing this QI project allowed the PMHNP-DNP student to identify this potential resource and connect the participant with the VA, which ultimately improved his access to mental healthcare and a financial resource.

Furthermore, the majority of participants that scored positively for MDD followed up with their primary care or mental health care providers, and over half of the participants that scored positively for social and emotional loneliness signed up for community activities. These findings indicated that the community-based screening intervention was effective at facilitating further mental health evaluation and participation in social activities. This supports the need for PMHNPs to create and implement home-based mental health screening programs in order to encourage prevention and early treatment of mental health disorders in older adults, such as MDD. The implementation of early screening within the older adult population and the appropriate resource referrals that follow can reduce the stigma surrounding mental health disorders, hospitalization, health care costs, and improve quality of life for these individuals. The PMHNP is in the ideal position to create and implement home-based mental healthcare models due to their rigorous, evidence-based education, skillset in assessing, diagnosing, and treating mental health needs, and experience working collaboratively with other providers (Joel, 2018). Furthermore, PMHNPs can use their knowledge to influence lawmakers and health insurers by

advocating for policy change that invests in preventive mental healthcare measures for older adults (Joel, 2018).

### **Facilitators and Barriers**

A facilitator for this QI project was the support and engagement from stakeholders at both project sites throughout the recruitment of participants and data collection. Stakeholders at the two project sites were willing to accommodate for any logistical issues such as room changes. Additionally, being able to implement the screening tools at the low income older adult residence where participants lived reduced the impact of physical and mobility limitations, including adverse weather. A barrier for this QI project included the time constraint for data collection. Inclement weather conditions caused the closing of the free medical clinic on a few days, preventing data collection on those days. The stigmatization of mental health disorders such as MDD made individuals less inclined to participate in this project.

### **Limitations**

This QI project encountered limitations primarily pertaining to the limited time frame in which data could be collected. Due to this time-frame, the sample size was small ( $n= 53$ ), which may have limited the generalizability of the data. Additionally, unpredictable weather closed the free medical clinic on several occasions, further reducing the already limited time available for data collection, potentially reducing the sample size.

### **Conclusion**

The population of older adults in the U.S. is steadily increasing and consequently, the number of older adults experiencing mental health disorders and their complications is increasing proportionally (Kane et al., 2018). This trend will lead to an increase in national healthcare costs if preventative measures are not implemented within community settings (Stanhope & Lancaster,

2013). The future of the U.S. healthcare system relies on new and innovative approaches designed for the prevention, promotion, and management of mental health disorders, such as MDD (CDC, 2017; USPSTF, 2016). In order to improve mental healthcare for older adults, home-based mental health care models must be created and implemented by PMHNPs within the community to identify and prevent the development of mental health disorders, reduce healthcare costs, and improve quality of life for older adults.

The results of this QI project were presented to project stakeholders and participants, as well as the UMass Amherst School of Nursing. In response to the QI project implementation and results, two social groups have been created and regular community activities are being planned at the low-income older adult residence to help reduce the rates of social and emotional loneliness among participants, and to help prevent further development of MDD in this population.

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## Appendix A

Table 2- Matrix of Literature Review

Author/Design	Hypothesis	n/Setting	Methods/Measures	Data Analysis	Outcomes/Results	Strengths (S)/Weaknesses (W)
Quantitative, Cross-sectional study, Level III, (Conradsson et al, 2013)	The 15-item Geriatric Depression Scale (GDS-15) is a reliable and effective screening tool for very old adults with cognitive impairment	N=834 / Very old adults in Sweden and Finland	15-item Swedish version of Geriatric Depression Scale 15 item (GDS-15), Mini-Mental Status Examination (MMSE), The Philadelphia Geriatric Center Morale Scale (PGCMS), The Barthel Index	<ol style="list-style-type: none"> <li>1) T-test and chi-squared test to detect differences between individuals assessed and those who declined</li> <li>2) Pearson's correlation calculated b/w GDS-15 and PGCMS within each MMSE score group</li> <li>3) Fisher r-to-z transformation compared correlation values for each MMSE group</li> <li>4) Cronbach's alpha test for GDS-15 calculated with in each MMSE group</li> </ol>	GDS-15 is effective for assessing depression in very old people with cognitive impairment down to a MMSE score of 10	<p>S: Large population, variety of cognitive levels, yes/no format, so easily understood by older people who have suffer from cognitive decline</p> <p>W: Many participants failed to complete all of the assessments (only 2/3 completed them), it is a very narrow population age. Additionally, fails to consider somatic symptoms such as weight loss, as these may simply be related to aging</p>
Quantitative, Cross-	PHQ-9 and PHQ-2 are	N=598 outpatients of	Patient Health Questionnaire 9	1) Complex categorical	In Japanese rural hospitals, PHQ-9	S: Study includes participants across a broad

<p>sectional study, Level III (Inagaki et al., 2013)</p>	<p>valid and effective screening tools when employed in a Japanese internal medicine setting</p>	<p>an internal medicine clinic in rural Japan</p>	<p>(PHQ-9) and Patient Health Questionnaire 2 (PHQ-2), Major Depression Episode module of the MINI</p>	<p>algorithms built into SPSS were used to calculate sensitivity, specificity, positive predictive value, odds ratio, and likelihood ratio of a positive and negative test of the PHQ-9 and PHQ-2</p>	<p>and PHQ-2 are valid tools when used in conjunction to detect depression without missing suicidality.</p>	<p>age range, study assesses the reliability of screening tools when implemented in conjunction with one another (as opposed to only one)</p> <p>W: Small sample size, racially homogenous sample, convenience sampling (only one hospital was selected for study), data analyses difficult to decipher</p>
<p>Quantitative, Cross-sectional study, Level III (Kocalevent et al., 2013)</p>	<p>PHQ-9 is an effective and reliable screening tool for depression across various healthcare and community settings.</p>	<p>N=5018 individuals across Germany.</p>	<p>The Nine Item Depression module from the Patient Health Questionnaire (PHQ-9), the Satisfaction with Life Scale, the 12 Item Short Form Health Survey</p>	<p>2) Chi Squared test and Kruskal-Wallis test to investigate differences for sociodemographic characteristics 3) Principal component factor analysis to test for factor structure of PHQ-9</p>	<p>Normative data for the PHQ-9 was generated across gender, and a prevalence rate 5.6% of moderate to high severity depression was identified using the PHQ-9 tool, indicating reliability</p>	<p>S: Large sample size, easy to understand analyses</p> <p>W: Homogenous population, study did not include standard criterion interviews, cut off point for screening with the PHQ-9 may need to be adjusted giving findings</p>
<p>Quantitative, Cross-sectional, Level III (Buckingham, Mackor, Miller,</p>	<p>The SLUMS is less likely to miss-score patients than the MMSE</p>	<p>N=150, of which 118 completed study / Older adults in Oregon (U.S.) living</p>	<p>MMSE, St. Louis University Mental Status Examination (SLUMS), demographics questionnaire</p>	<p>1) Analyzed average scores of MMSE and SLUMS, followed by paired samples t-test to show significance</p>	<p>This study showed that SLUMS is psychometrically superior to MMSE and less likely to miss a possible dementia case</p>	<p>S: Varied living environments</p> <p>W: Not randomized, additional research must be conducted before making claim that one test should</p>

<p>Pullman, &amp; Molloy, 2013)</p>		<p>independently, in assisted living, or in nursing facilities</p>		<p>2) Independent samples t-tests compared difference in residential environments</p>		<p>be utilized more often or in place of another</p>
<p>Quantitative, Cross-sectional study, Level III (Feliciano et al., 2013)</p>	<p>SLUMS is more reliable and valid at predicting performance of memory and executive functioning than the MMSE</p>	<p>N= 170 / Community dwelling older adults in Colorado (U.S.)</p>	<p>MMSE, SLUMS, Trail Making Tests (Parts A and B), Rey Auditory Verbal Learning Test, Wisconsin Card Sorting Test</p>	<p>1) Means, standard deviations, and distributions were compared 2) Correlations b/w MMSE and SLUMS with the other three tests tested predictive validity 3) Multiple regression analyses to determine efficacy of SLUMS and MMSE</p>	<p>SLUMS is more effective than the MMSE at predicting cognitive functioning</p>	<p>S: Compared to several other scales, literature cited was easy to obtain and review  W: Small sample, long two hour duration for each test administered to patients, participants were broadly white or Caucasian identifying (study lacked diversity), participants were all cognitively healthy (dementia patients were excluded)</p>
<p>Quantitative, RCT, Level I (Grygiel, Humenny, Rebisz, Switaj, &amp; Sikorska, 2013)</p>	<p>The Polish DJGLS is valid and reliable</p>	<p>N= 949 / Students from the University of Rzeszow (Poland)</p>	<p>De Jong Giervald Loneliness Scale (DJGLS), UCLA Loneliness Scale (UCLA), The Lubben Social Network Scale, Berlin Social Support Scales, Rosenberg Self-</p>	<p>1) Differential item functioning analyzed the Polish translation 2) Analysis of reliability and validity of the scale 3) Evaluated DJGLS against</p>	<p>The Polish and English DJGLS are sufficiently consistent, reliable, and valid when compared to other scales</p>	<p>S: Large sample size, compared to a number of other similar scales  W: small demographic variety, participant groups are poorly described, analysis failed to consider influence of marital status, type of residences, health</p>

			Esteem Scale, Beck Depression Inventory, Center for Epidemiologic Studies depression Scale	other similar scales 4) Bifactor structure of the scale was analyzed		status, living alone, or parent-child bonds
Quantitative, Cross-sectional study, Level III (Buz, Urchaga, & Polo, 2014)	Test the hypothesis of one or two factor solutions, as well as assess the reliability of the DJGLS utilizing factorial methods	N= 360 / Community-dwelling older adults in Spain	DJGLS, Satisfaction with Life Scale (SWLS)	1) Confirmatory Factor Analysis (CFA) to test unidimensionality 2) Exploratory Analyses observed factorial solutions	The DJGLS is a unidimensional scale that measures general loneliness and is not accurate at differentiating social and emotional loneliness	S: Used three most-popular best fit models, sociodemographic profile of sample was very similar to reference population  W: Little variety in study population, scale fails to assess types of loneliness, sample addressed is not probabilistic
Quantitative, RCT, Level I (Penning, Liu, & Chou, 2014)	Assess the factor structure and invariance properties of the UCLA Loneliness Scale (UCLA) and the DJGLS	N= 204 / Middle aged and older adults in Canada	DJGLS, UCLA	1) CFA tested unidimensionality 2) EFA analyses assess factor structures	The DJGLS is more reliable than the UCLA for middle aged and older adults	S: Randomly selected, assessed understudied population in this field (mid-aged adults)  W: Small sample, lack of adequate unidimensional model fit for sample, study results are poorly structured
Quantitative, Cross Sectional, Level III (O'Riley et al., 2014)	Assess death and suicide ideation using the PHQ-9 and the Paykel	N=377 community dwelling adults in Monroe	The Patient Health Questionnaire 9 (PHQ-9) and the Paykel Scale	1) Logistic regression to compare participants who did not experience	Death and suicide ideation are common amongst older adults clients, and there were differences as well	S: Sample was similar to reference population, easy to review and obtain literalize cited, simple 'yes/no' questionnaire

	Suicide Scale in older adults	County, NY (U.S.)		<p>current death or suicide ideation</p> <p>2) Correlation and cumulative logistic regression to compare no current suicide and death ideation, infrequent ideation, and frequent ideation</p>	as similarities between correlates of death and suicidal ideation	W: Small sample size, analyses poorly explained and difficult to understand
Quantitative, Cross-sectional study, Level III (Kaya et al., 2016)	The St. Louis University Mental Status Examination (SLUMS) is more reliable than the Mini-Mental Status Examination (MMSE)	N = 274 / Older adults enrolled in a geriatric outpatient clinic in Turkey	SLUMS, MMSE, GDS	<p>1) 1-way variance or Kruskal-Wallis test tested b/w group differences</p> <p>2) Cronbach alpha test analyzed internal consistency</p> <p>3) Area under curves of receiver operating characteristic analysis used to measure accuracy of SLUMS</p>	SLUMS is a reliable and valid instrument for evaluating cognitive impairment, the SLUMS and MMSE were strongly correlated with dementia patients and moderately correlated for patients with mild cognitive impairment	<p>S: Large sample size, measured correlation at each level of impairment</p> <p>W: Not randomized, measured Turkish translation of SLUMS, study excluded patients with physical disabilities (i.e.: deafness and blindness)</p>
Quantitative, Cross-sectional study, Level	The PHQ-9 is a valid and reliable tool in patients with a range of	N=1023 patients receiving treatment at McLean	PHQ-9, MINI, CESD-10, GAD-7, SOS, DPSS-R, CGIS	1) Examined convergent validity with independent samples t-test	PHQ-9 is effective as a severity measure and as a measure of treatment outcome	S: Large sample size, heterogeneous psychiatric sample, consideration of possible gender differences in assessing study results,

<p>III (Beard et al., 2016)</p>	<p>psychiatric disorders</p>	<p>Hospital, Massachusetts (U.S.)</p>		<p>2) Confirmatory factor analysis to identify and validate the factor structure underlying PHQ-9 3) Multigroup confirmatory factor analysis to assess differences in factor structure underlying the PHQ-9 between gender</p>	<p>across a range of psychiatric disorders.</p>	<p>breadth of psychometric questions used in study.  W: Shorter timeframe may be needed in order to assess treatment progress, sample not diverse in ethno-racial background</p>
<p>Quasi experimental study, Level II (Costa et al., 2015)</p>	<p>Determine the sensitivity and specificity of the GDS-15, PHQ-9, and HDRS-17 to diagnose major depressive episodes in the older adults</p>	<p>N=129 older adults in Brazil</p>	<p>GDS-15, PHQ-9, HDRS-17, MINI</p>	<p>1) Mann-Whitney and Chi squared analyses were used to assess differences in demographic and clinical characteristics between depressed individuals and controls</p>	<p>PHQ-9 and GDS-15 are effective in diagnosing major depressive episodes in older adults, while the HDRS-17 showed no significant differences in screening sensitivity</p>	<p>S: Criteria for participant inclusion and exclusion was clear, analyses were concise and understandable, careful psychiatric evaluation of participants to track accurate progress.  W: Small sample size, sample is predominately female (88%), participants were recruited at a tertiary clinic (convenience sampling was used).</p>
<p>Quantitative, Cross-sectional</p>	<p>DJGLS is an effective</p>	<p>N=1,140 / Turkish, Moroccan, and</p>	<p>DJGLS, Health and demographics</p>	<p>1) Reliability of DJGLS assessed</p>	<p>DJGLS was effective and reliable for</p>	<p>S: Translation discrepancies were discussed and resolved,</p>

<p>study, Level III (Uysal-Bozkir et al., 2017)</p>	<p>measure for migrants</p>	<p>Surinamese older adult migrants in the Netherlands</p>		<p>by Cronbach's alpha test 2) Latent class analysis (LCA), Bayesian information criterion (BIC), and Akaike information criterion (AIC)</p>	<p>measuring emotional and social loneliness among migrant populations</p>	<p>large sample size, study provides abundant evidence in support of DJGLS reliability across cultural backgrounds  W: Sample not necessarily representative of all migrants or general population, additional research required to assess ethnic differences in levels and determinants of loneliness, study failed to include direct measures of loneliness (i.e.: "Do you feel lonely?")</p>
<p>Quantitative Cross-sectional Study, Level III (Lasgaard, Friis, &amp; Shevlin, 2016)</p>	<p>Socio-demographics and health-related factors across age groups influence the risk for loneliness.</p>	<p>N=33,285 / Danish individuals ages 16-102 (Denmark)</p>	<p>2013 Danish National Health Survey, Three-Item Loneliness Scale</p>	<p>1) Calculated prevalence of moderate and severe loneliness 2) Multi-nomial logistic regression analyses assessed socio-demographic and health-related variable in lonely population 3) Binary logistic regression analyzed five age groups of</p>	<p>There was a strong association between socio-demographic and health-related factors and loneliness. Ethnic minority status, living alone, and prolonged mental disorders were associated with severe loneliness.</p>	<p>S: Large population-based sample size, large variation in age of individuals assessed  W: Cross-sectional data means no causation can be made, people who are hospitalized and unable to complete the survey are not represented, response rate of oldest individuals was low, people with limited Danish language skills could not complete survey</p>

				population with loneliness		
Quantitative, Cross-sectional, Level III (Chiesi et al., 2017a)	The GDS-15 does not produce gender and age biased measures	N=1,305 / Older adults in Italy	GDS-15	1) IRT Likelihood Ratio test 2) Preliminary analyses used local dependence	The study shows that GDS-15 works the same in older adults of varying age and gender	S: Large sample size, IRT sample-free estimations  W: Italian speaking participants only, individuals with physical disabilities were excluded
Quantitative, Cross-sectional, Level III (Chiesi, et al., 2017b)	The GDS-15 is reliable among various levels of cognitive function	N=1,903/ Older adults in Italy	GDS-15, MMSE	1) Dimensionality of GDS-15 tested using IRT analysis 2) ITR Likelihood Ratio tested GDS-15 within cognitive groups	Though some discrepancies exist, this study supports the widespread use of GDS-15 in the older adults	S: Large sample size, results are laid out in a concise and succinct manner  W: Italian speaking only, relatively small “mild cognitive impairment” group compared to other cognitive groups
Quantitative, Cross-sectional study, Level III (Midden & Mast, 2017)	The differential item functioning of the GDS-15 is unbiased based on the presence of cognitive impairment	N= 215 / Older adults in primary care setting in Louisville (U.S.)	GDS-15, Mattis Dementia Rating Scale-2 (DRS-2)	1) CFA assessed unidimensionality 2) Differential Item Functioning (DIF) measured differences in parameter estimates	GDS-15 is not biased by the presence or absence of cognitive impairment	S: Variety of cognitive levels among population, results of study are presented in a clear and succinct manner  W: Not a diverse population, small sample size
Quantitative, Cross-sectional, Level III,	The DJGLS is a valid tool for screening	N=335 / Older adults attending University of	DJGLS, UCLA, Spanish adaptation of the Functional	1) IRT analysis involving structural equation	DJGLS measured loneliness with adequate levels of reliability and	S: All available competitive models for factor validity were tested,

<p>(Tomas, Pinazo-Hernandis, Donio-Bellegarde, &amp; Hontangas, 2017)</p>	<p>loneliness in older adults</p>	<p>Valencia's Lifelong Learning programs, Spain</p>	<p>Social Support Questionnaire</p>	<p>modeling (SEM) and confirmatory factor analysis (CFA) assessed psychometric properties</p>	<p>validity in this study</p>	<p>DJGLS was tested against other scales  W: Small and specific demographic, need for additional samples of older adults at risk of suffering loneliness, several models of the study are identically specified, but are interpreted as an additional method factor</p>
<p>Quantitative, Cross-sectional, Level III(Yoelin &amp; Saunders, 2017)</p>	<p>Individuals with more years of education would produce higher scores on both the MMSE and SLUMS</p>	<p>N=75 / Older adults (over the age of 60) living in the community in Virginia (U.S.)</p>	<p>MMSE, SLUMS</p>	<p>1) Paired samples t-tests measured overall effectiveness of MMSE and SLUMS 2) Pearson product-moment correlation test analyzed difference b/w MMSE and SLUMS taking education level into account</p>	<p>Participants with more education did not produce higher scores on MMSE or SLUMS. For participants with a high (but not low) education level, there was a minor difference in mean score between MMSE and SLUMS</p>	<p>S: Education level was considered, established SLUMS and MMSE score conversion  W: Homogenous population sample, small sample size, other factors (besides education) not considered for study, low education group was small, convenience sampling may have introduced bias</p>

(Garrard, 2011)

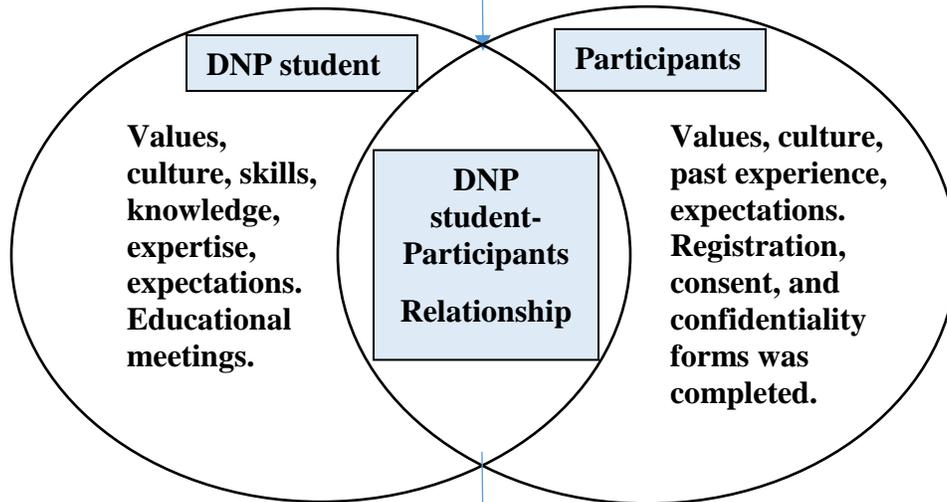
Appendix B

**Diagram: Hildegard Peplau’s Interpersonal Relationship**

**Preorientation Phase:**

QI Team, stakeholders, DNP student, volunteers must acknowledge personal feelings, thoughts, concerns, biases and limitations. QI project presented to both sites. IRB was approved.

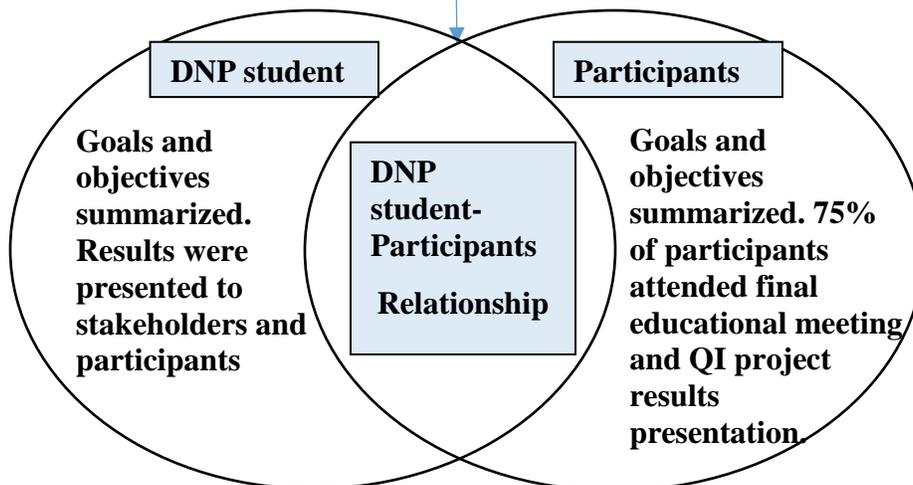
**Orientation Phase:**



**Working Phase:**

DNP student and participants maintained their trust-relationship in order to gather data through: SLUMS, DJGLS-11, PHQ-9, overcome resistance behaviors, destigmatize mental health disorders, and refer participants who scored positive for MDD to PCP or mental health care provider

**Termination Phase:**



**Appendix C****Table 3** – Budget Table. Description of costs per QI project supply and the amount necessary for eight months of implementation of the project.

<b>QI Project Supply</b>	<b>Cost x Amount</b>	<b>Cost</b>
Education Training	\$0 x 56 hours	\$0
Education Material	\$0.78/brochure x 100 patients x 2 meetings	\$156.00
Envelopes	\$10/box of 100	\$10.00
Stamps	\$ 0.49/stamp x 100 patients	\$49
Registration Forms	\$0.23/form x 100 patients x 2 (copy)	\$46.00
Informed Consent Form	\$0.23/form x 100 patients x 2 (copy)	\$46.00
Patient Confidentiality (HIPPA Form)	\$0.23/form x 100 patients x 2 (copy)	\$46.00
SLUMS Scale	\$0.23/Questionnaire x 100 patients x 2 (copy)	\$46.00
DJGLS-11-6	\$0.23/Questionnaire x 100 patients x 2 (copy)	\$46.00
PHQ-9	\$0.23/Questionnaire x 100 patients x 2 (copy)	\$46.00
<b>TOTAL</b>	<b>Cost of Implementation</b>	<b>\$706</b>

### Appendix D

**Table 4** – Key stakeholder positions and responsibilities in the QI project.

<b>Stakeholder Position</b>	<b>Site</b>	<b>Responsibilities</b>
Free Medical Clinic Director	Saint Anne's Free Medical Clinic	Secure the site, oversee the collection of recruitment forms, recruit new participants, secure assessment room
Free Medical Clinic Coordinator	Saint Anne's Free Medical Clinic	Make appointment for the meetings with volunteers and stakeholders
Saint Anne's Free Medical Clinic Board Members	Saint Anne's Free Medical Clinic	Designate a room for securely and safely storing the registry forms and patient files,
Volunteer Coordinator	Saint Anne's Free Medical Clinic	Schedule and oversee coordination and replacement of volunteers
Federal Housing Manager	Shrewsbury Tower Residence	Authorize going into Shrewsbury Tower Residence
Social Service Coordinator	Shrewsbury Tower Residence	Help identify potential suitable participants living in the Shrewsbury Tower Residence

**Table 5** – QI interdisciplinary team positions and responsibilities.

<b>QI Team Position</b>	<b>Responsibilities</b>
Registered Nurses & Project Volunteers (4)	Collect participant information through registration form for assessment, data organization
PMHNP-DNP Student	Collect data using assessment tools, disseminate results to participants and stakeholders, send written results to follow up with the PCP or mental health care provider

Appendix E

# VAMC SLUMS EXAMINATION

Questions about this assessment tool? E-mail [aging@slu.edu](mailto:aging@slu.edu)

Name \_\_\_\_\_ Age \_\_\_\_\_

Is the patient alert? \_\_\_\_\_ Level of education \_\_\_\_\_

_ /1	<b>1</b>	1. What day of the week is it?
_ /1	<b>1</b>	2. What is the year?
_ /1	<b>1</b>	3. What state are we in?
		4. Please remember these five objects. I will ask you what they are later. <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>Apple</span> <span>Pen</span> <span>Tie</span> <span>House</span> <span>Car</span> </div>
		5. You have \$100 and you go to the store and buy a dozen apples for \$3 and a tricycle for \$20.
_ /3	<b>1</b>	How much did you spend?
	<b>2</b>	How much do you have left?
_ /3		6. Please name as many animals as you can in one minute.
	<b>0</b>	0-4 animals
	<b>1</b>	5-9 animals
	<b>2</b>	10-14 animals
	<b>3</b>	15+ animals
_ /5		7. What were the five objects I asked you to remember? 1 point for each one correct.
		8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24.
_ /2	<b>0</b>	87
	<b>1</b>	648
	<b>1</b>	8537
		9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock.
_ /4	<b>2</b>	Hour markers okay
	<b>2</b>	Time correct
		
_ /2	<b>1</b>	10. Please place an X in the triangle.
		
	<b>1</b>	Which of the above figures is largest?
		11. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it.
		Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after.
_ /8	<b>2</b>	What was the female's name?
	<b>2</b>	When did she go back to work?
	<b>2</b>	What work did she do?
	<b>2</b>	What state did she live in?

\_\_\_\_\_ TOTAL SCORE

SCORING		
HIGH SCHOOL EDUCATION	NORMAL	LESS THAN HIGH SCHOOL EDUCATION
27-30	25-30	
21-26	MILD NEUROCOGNITIVE DISORDER	20-24
1-20	DEMENCIA	1-19

CLINICIAN'S SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_ TIME \_\_\_\_\_

SH Tariq, N Tumosa, JT Chibnall, HM Perry III, and JE Morley. The Saint Louis University Mental Status (SLUMS) Examination for detecting mild cognitive impairment and dementia is more sensitive than the Mini-Mental Status Examination (MMSE) - A pilot study. *Am J Geriatr Psych* 14:900-10, 2006.

### Appendix F

#### De Jong Gierveld Loneliness Scale 11-item (DJGLS-11)

In this 11-item scale, six statements are made about “emotional loneliness” and five about “social loneliness”. Social loneliness (SL) occurs when someone is missing a wider social network and emotional loneliness (EL) is caused when you miss an “intimate relationship”.

Circle the response that applies to you for each statement:

1. There is always someone I can talk to about my day-to-day problems.  

Yes	More or Less	No
-----	--------------	----
2. I miss having a really close friend.  

Yes	More or Less	No
-----	--------------	----
3. I experience a general sense of emptiness.  

Yes	More or Less	No
-----	--------------	----
4. There are plenty of people I can lean on when I have problems.  

Yes	More or Less	No
-----	--------------	----
5. I miss the pleasure of the company of others.  

Yes	More or Less	No
-----	--------------	----
6. I find my circle of friends and acquaintances too limited.  

Yes	More or Less	No
-----	--------------	----
7. There are many people I can trust completely.  

Yes	More or Less	No
-----	--------------	----
8. There are enough people I feel close to.  

Yes	More or Less	No
-----	--------------	----
9. I miss having people around.  

Yes	More or Less	No
-----	--------------	----
10. I often feel rejected.  

Yes	More or Less	No
-----	--------------	----
11. I can call on my friends whenever I need them.  

Yes	More or Less	No
-----	--------------	----

**To score responses and interpret the results:**

There are 6 negatively (2, 3, 5, 6, 9, 10) and 5 positively (1, 4, 7, 8, 11) worded items. On the negatively worded items, the neutral and positive answers are scored as “1”. Therefore, on questions 2, 3, 5, 6, 9, and 10 score, Yes=1, More or less=1, and No=0. On the positively worded items, the neutral and negative answers are scored as “1”. Therefore, on questions 1, 4, 7, 8, and 11, score Yes=0, More or less=1, and No=1. This gives a possible range of scores from not lonely (0-2), moderate (3-8), severe (9-10), and very severe (11).

**Source:** De Jong Gierveld, J., & Van Tilburg, T. (1999). Manual of the Loneliness Scale. Retrieved August 5, 2018, from <https://research.vu.nl/ws/portalfiles/portal/1092113>

### Appendix G

#### PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Over the last 2 weeks, how often have you been bothered by any of the following problems?  
(use "✓" to indicate your answer)

	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 figety 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	0	1	2	3

add columns  +  +

(Healthcare professional: For interpretation of TOTAL, TOTAL:   
please refer to accompanying scoring card).

10. 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	_____

Appendix H

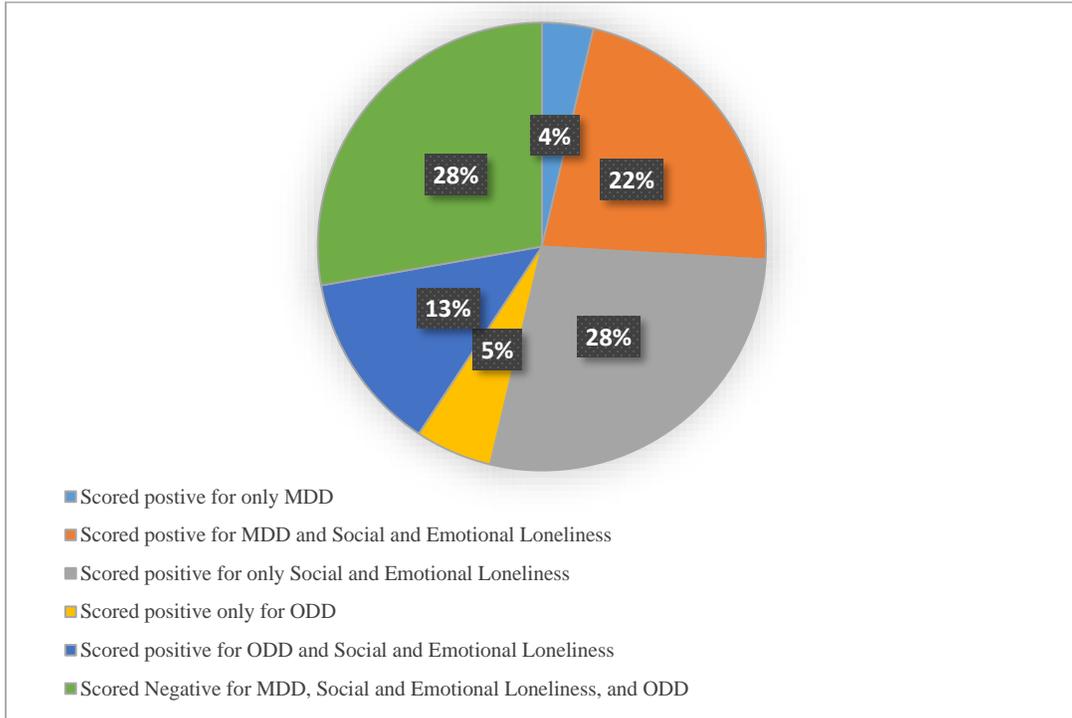


Figure 1. Percentage of participants in each score grouping based on results of assessment tools.

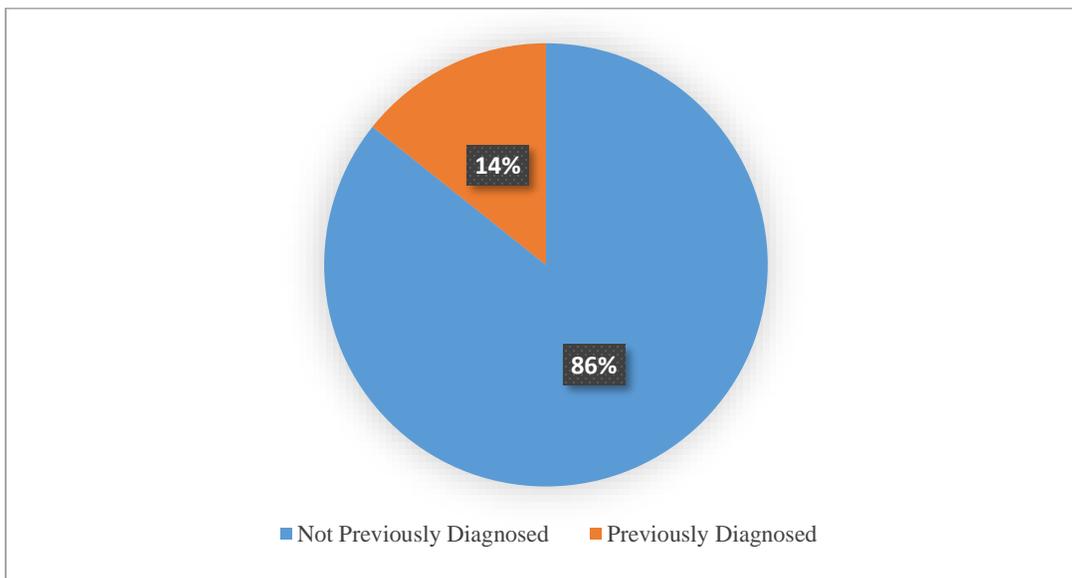


Figure 2. Percentage of participants that scored positive for MDD that were not previously diagnosed.

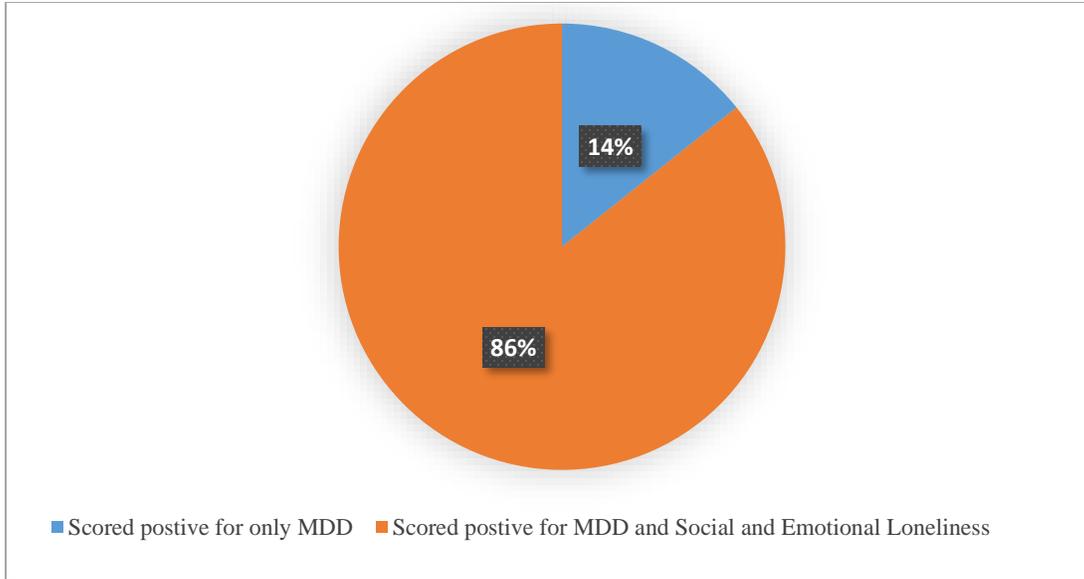


Figure 3. Percentage of participants that scored positive for only MDD compared to those that scored positive for MDD and social and emotional loneliness.

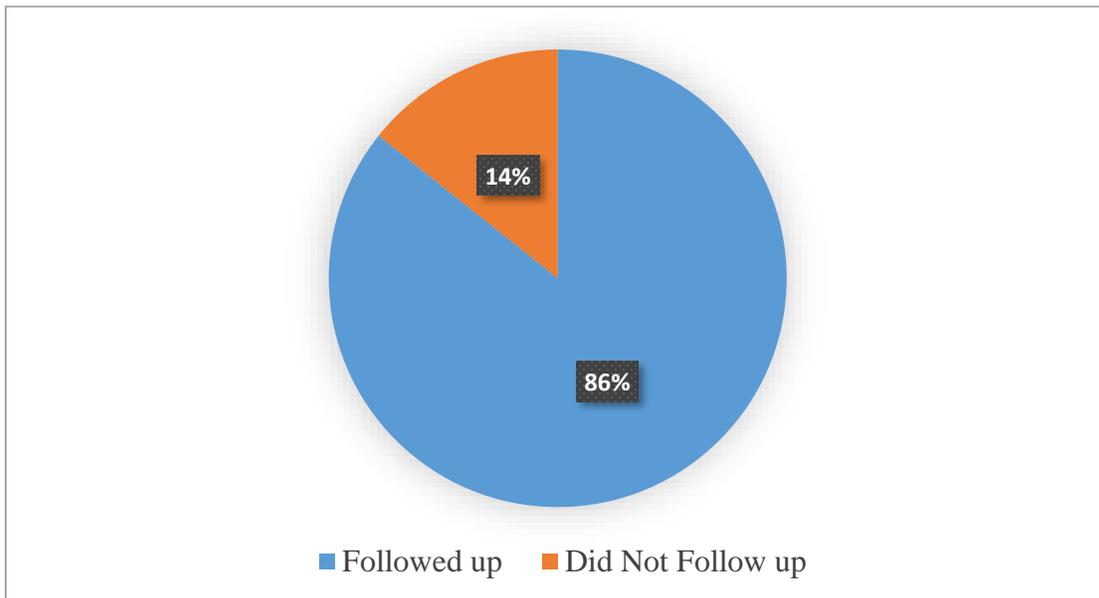


Figure 4. Percentage of participants that scored positive for MDD that followed up with a PCP or mental healthcare provider

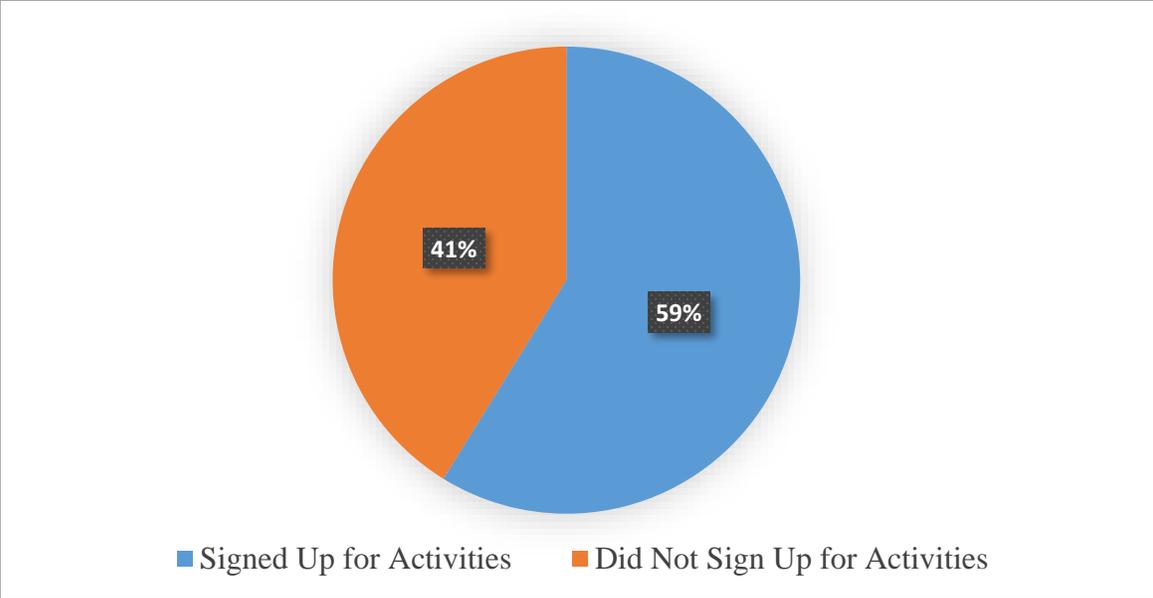


Figure 5. Percentage of participants that scored positive for emotional and social loneliness that signed up for activities.

## Appendix I

Table 5

*Chi-Squared Test of Independence for Participants Who Scored Positive for MDD and Participants Who Scored Positive for Social and Emotional Loneliness*

	<i>Value</i>	<i>df</i>	<i>Asymptotic Significance (2-sided)</i>	<i>Exact Sig. (2-sided)</i>	<i>Exact Sig. (1-sided)</i>
Pearson Chi-Square	3.847	1	0.050*		
Continuity Correction	2.678	1	0.102		
Likelihood Ratio	4.264	1	0.039*		
Fisher's Exact Test				0.060	0.047*
Linear-by-Linear Association	3.774	1	0.052		
N of Valid Cases	53				

*Note.* A significant association was observed between participants who scored positive for MDD and participants who scored positive for social and emotional loneliness (Chi-Squared=3.847,  $p=0.050$ ).

Table 6

*A One-Way Analysis of Variance Test Comparing Participants that Had Previously Been Diagnosed with MDD to Participants that Scored Positive for MDD and Social and Emotional Loneliness*

	<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
MDD	Between groups	1	1.244	1.244	7.891	0.007*
	Within groups	51	8.039	0.158		
	Total	52	9.283			

*Note.* When comparing participants that had previously been diagnosed with MDD to participants that scored positive for MDD and social and emotional loneliness, there was a significant difference ( $F=7.891$ ,  $p=0.007$ ).

Table 7

*A One-Way Analysis of Variance Test for Participants Who Scored Positive for MDD and Social and Emotional Loneliness between Sites*

	<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
MDD	Between groups	1	0.210	0.210	1.061	0.308
	Within groups	51	10.092	0.198		

	Total	52	10.302			
Social and Emotional Loneliness	Between groups	1	1.614	1.614	7.784	0.007*
	Within groups	51	10.575	0.207		
	Total	52	12.189			

*Note.* When comparing participants who scored positive for MDD and social and emotional loneliness between sites, there was no significant difference in participants who scored positive for MDD between both sites ( $F=1.061$ ,  $p\text{-value}=0.308$ ). However, there was a significant difference in participants who scored positive for social and emotional loneliness between both sites, with those at the low income older adults housing site experiencing greater rates of social and emotional loneliness compared to those at the free medical clinic ( $F=7.784$ ,  $p\text{-value}=0.007$ ).

Table 8

*A One-Way Analysis of Variance Test Comparing PCP Follow-Up for Participants Who Scored Positive for MDD at Each Site*

	Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
MDD	Between groups	1	0.578	0.578	2.020	0.161
	Within groups	51	14.592	0.286		
	Total	52	15.170			

*Note.* When comparing PCP follow-up for participants who scored positive for MDD at each site, there was no significant difference in patients who pursued follow-up treatment with their primary care provider between the two sites ( $F=2.020$ ,  $p\text{-value}=0.161$ ).

Table 9

*A One-Way Analysis of Variance Test Comparing Community Activity Follow-Up for Participants Who Scored Positive for MDD at Each Site*

	Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
MDD	Between groups	1	0.007	0.007	0.031	0.862
	Within groups	51	11.540	0.226		
	Total	52	11.547			

*Note.* When comparing PCP follow-up for participants who scored positive for MDD at each site, there was no significant difference in patients who pursued follow-up treatment with their primary care provider between the two sites ( $F=2.020$ ,  $p\text{-value}=0.161$ ).