EFFECTIVENESS OF SUICIDE PREVENTION PROGRAMS TO REDUCE SUICIDE IDEATION AND BEHAVIOR IN OLDER ADULTS: A SYSTEMATIC REVIEW OF THE LITERATURE FROM 2009-2016

by

MARISSA STEEN WALLACE

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Abstract

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Marissa Steen Wallace, MSW

The University of Texas at Arlington, 2017

Supervising Professor: Noelle Fields

A systematic review was conducted to replicate a previous systematic review and to examine the effectiveness of various suicide prevention interventions for the older adult population. A search through 6 databases presented 7 articles that met all elibility criteria. All included articles presented interventions for adults age 60 and over that resulted in a statistically significant reduction in suicide ideation or behavior. The programs were reviewed with the GRADE protocol, which measured the quality of methods and results, and included strengths and limitations of the studies. The discussion provided implications of intervention settings and suggestions for future directions for social work practicitioners.

Table of Contents

Acknowledgements iii

Abstract iv

List of Illustrations vi

List of Tables vii

Chapter 1 Introduction 1

Chapter 2 Review of the Literature 5

Chapter 3 Methods 16

Chapter 4 Results 21

Chapter 5 Discussion 31

Appendix A Preferred Reporting Items for Systematic Reviews and Meta-Analysis 41

Appendix B Criteria for GRADE 43

Appendix C Terms Defined 45

References 47

Biographical Information 57

List of Illustrations

Figure 1 – PRISMA Flow Diagram……..20

List of Tables

Table 1 – Outcomes……..……28

Table 2 – GRADE……..…….30

Chapter 1: Introduction

Nature of the Problem

According to Centers for Disease Control and Prevention (2014), there are approximately 10,000 adults over age 60 who die by suicide every year. The current estimated rates of suicide in adults from aged 65 to 74 are 15 per 100,000, and increase to 17 per 100,000 for adults aged 75-84 (American Association of Marriage and Family Therapy, 2016). In 2014, older adults (age 65 and over) accounted for 14.5% of the overall population in the United States while accounting for 18.0% of completed suicides (Drapeau & McIntosh, 2015b). Suicide prevalence in older adults is a concern because suicide in this age group is underreported by as much as 40%, due to deaths by “silent suicides” which include “accidents,” starvation, dehydration, and overdose (American Association of Marriage and Family Therapy, 2016). Suicide risk in older adults over age 85 is especially concerning because suicide rates for this population are not only the highest among the age groups, but also the suicide rates for adults over 85, as well as the 65 and above age group, have been on a consistent rise since 2011 (American Foundation for Suicide Prevention, 2016). Suicide prevention for older adults can be implemented in several different ways, including prevention for a specific geographic location,

prevention for a specific diverse population, and prevention efforts funded by local or state agencies.

The Centers for Disease Control and Prevention (2016) define suicide as, “death caused by self-directed injurious behavior with an intent to die as a result of the behavior.” Mental health problems are often a precursor to a suicidal thought or act. Suicide carries a financial burden because the annual medical and work loss costs due to suicide amount to over $40 billion (Centers for Disease Control and Prevention, 2015b). According to Centers for Disease Control and Prevention (2016), suicide is ranked 10th for causes of death in the United States. Suicide risk factors can inform suicide prevention strategies and programs by providing a specific reduction goal.

Relevance of the Problem

As the older adult population continues to grow, the health concerns associated with this population will place great responsibility on health care policy makers as well as clinicians for effective and efficient management of mental illness and suicide risk. The Administration for Community Living (2016) states that the population of older adults in 2060 is projected to double the population of 46.2 million in 2014. Therefore, social workers and other health professionals must be ready and competent to meet the special needs of this rapidly growing population of

older adults. Because the older adult population has a higher risk for suicide, it is important to be aware of evidence-based strategies available for the prevention of suicide in older adults.

Suicide prevention programs are designed to assist in the reduction of risk factors associated with suicidality while increasing support and protection against suicide (Substance Abuse and Mental Health Services Administration, 2015). Suicide prevention programs for the older adult population have included telephone counseling, community-based outreach, clinical treatment, and improving resilience (Lapierre, 2011). Research on suicide prevention programs for older adults has shown greater efficacy in women verses men (Lapierre, 2011). This evidence suggests a need for different types of suicide prevention programs and interventions for older adult men, because men are 3.5 times more likely to die by suicide than women (American Foundation for Suicide Prevention, 2016). A study on short-term depression treatment using psychotherapy in older adults has produced positive results for the reduction of suicide ideation in all 395 participants (Szanto, Mulsant, Houck, Drew, & Reynolds, 2003). Overall, studies suggest that there is a need for more research related to interventions with older adults with suicide risk (Lapierre, 2011).

The proposed study is relevant to social work because by 2020, approximately 70,000 social workers will be needed to meet the needs of the nearly one in six Americans projected to be 65 years and older (NASW, 2016a). Social workers provide services to older adults and their families in a variety of settings including hospitals, long-term care, hospice, and home and community-based services (NASW, 2016b). Across these settings, social workers may likely interface with older adults who are at risk for suicide. Suicide prevention in older adults is also important to social work because the profession advocates on behalf of those at risk to ensure that all people have equal opportunities to maintaining quality of life (NASW, 2016b). Geriatric social workers are expected to have competent skills in several areas, including in the ability to make contributions to the improvement and development of research, practice, and social policies that enhance quality of life for older adults (NASW Press, 2015). In the future, social workers will continue to be integral team members in settings that serve the needs of the growing population of older adults and it is critical that social workers are knowledgeable and prepared to assess and intervene with older adults at risk for suicide.

Chapter 2: Review of the Literature

Older adults often face many challenges as they transition into later life, such as chronic health problems, financial hardship, and loss of social connectedness (Segel-Karpas, Ayalon, & Lachman, 2016). Ageism, which is the systematic discrimination and stereotyping of older adults, impacts the self-esteem of older adults because societal attitudes decrease opportunities for feelings of belonging (Levy & Macdonald, 2016). The national mental health and health concern regarding older adult suicide risk is an important topic for social work research because social workers have an ethical obligation to enhance the well-being of individuals, especially for those who are vulnerable (NASW Press, 2015). Older adults are a vulnerable population because there are a limited number of professionals who specialize in older adult mental and physical health (Warshaw & Bragg, 2016). Additionally, the older adult population is vulnerable because they are at risk for poverty in later life due to their reduced income (Schroder-Butterfill & Marianti, 2013).

A study by Gamliel and Levi-Belz (2016) provides evidence that ageism has a moderating effect on the understanding of older adult suicide – analysis of questionnaire responses on ageism and attitudes towards older adult suicide concluded there was a strong correlation. Suicide incidence in older adults is a critical topic because suicide risk

often goes unrecognized in this population (Nugent & Cummings, 2014). Suicide continues to be a difficult topic due to society's general discomfort about discussing the facts about suicide and its associated risk factors, which may provide an explanation for the minimal amount of research on older adult suicide prevention (Duberstein and Heisel, 2014). Additional research is needed for assessing suicide in older adults, because older adults are currently underrepresented in suicide research (Westefeld et al., 2014; Szanto et al., 2013).

Research on late life suicide suggests several associated risk factors for the older adult population. Older adults at risk for suicide generally exhibit one or more of the following: "psychiatric diagnoses, physical illness, personality variables, social support, career issues, financial resources, autonomy and mobility, and cognitive loss" (Westefeld et al., 2014, p.492). A case control study by Beautrais (2002) analyzed adults 55 and older with comparison subjects, and results showed that suicide risk was higher in participants who had current mood disorders, as well as little socialization and a psychiatric hospitalization in the past year. Further, in older adults who complete suicide, as many as 71% to 97% of deaths by suicide occur while an older adult had a psychiatric illness (Conwell, Van Orden, & Caine, 2011).

A Review of Risk Factors For Suicide in Older Adults: Depression, Social Support, Substance Abuse, Sex, and Age

Depression. It has been reported that depression is the strongest risk factor in older adult suicide (Stanley, Hom, Rogers, Hagan, & Joiner, 2016). However, depression often goes unnoticed in older adults, which has led to the under diagnosis and under treatment of depression (Fullen, 2016; Corrigan, Swantek, Watson, & Kleinlein, 2003). Research suggests that, “depressed older adults are less likely to endorse affective symptoms and more likely to display cognitive changes, somatic symptoms, and loss of interest than are younger adults,” (Fiske, Wetherell, & Gatz, 2009, p.1). Additionally, research suggests that older adults tend to avoid seeking out mental health treatment because of the perceived stigma associated with receiving mental health services (Conner et al., 2010). The under diagnosis of depression and avoidance of treatment in the older adult population are relevant issues to consider in the planning of suicide prevention programs.

There is a shortage of health professionals, including gerontologists, nurses, and social workers, who specialize in the aging population (Nugent & Cummings, 2014). The shortage of specialized care for older adults has led to a shortage of training and assessments intended to recognize suicide ideation in this population (Nugent &

Cummings, 2014). Older adults suffering with depression may not receive needed treatment, including medication and psychotherapy, if their symptoms are not recognized. Research has revealed that, even though older adults over 85 have the highest suicide rate of all age groups, this age group has the lowest use of antidepressants of all age groups – about 17% of older adults aged 85 and older who die by suicide were using antidepressants (Szanto et al., 2013).

Research indicates that financial insecurity has a strong impact on depression and suicidal ideation in older adults. A study by Gilman et al. (2011) found significantly higher depression ratings as well as higher suicidal ideation ratings among older adult participants who had incomes below $20,000. Individuals with low socioeconomic status and inadequate preparation for retirement may result in poor adjustment and higher levels of anxiety, further increasing the risk for suicide (Westefeld et al., 2014).

Social Support. Research suggests a relationship between social connectedness and suicide risk in older adults. Census data reports deaths by suicide occur more frequently in older adults who live alone, as compared to older adults who live with at least one other person (Conwell, Duberstein, & Caine, 2002). Additionally, research on predictors of suicide among older adults suggests that loneliness is associated with suicide (Waern, Rubenowitz, & Wilhelmson, 2003). There are also suicide risk

factors related to levels of social support in older adults. Older adults with low social support levels can be at elevated risk for suicide (Westefeld et al., 2014). Lack of social connectedness and activity in society may contribute to elevated suicide risk (Stanley, Hom, Rogers, Hagan, & Joiner, 2016).

Substance Abuse. Research suggests that among older adults with completed suicides, investigations of the mental status of deceased individuals through a psychological autopsy shows that a large percentage of older adults have a mental illness at the time of death (Conwell, Duberstein, & Caine, 2002). Although substance use disorders are more prevalent in younger adults than older adults, Conwell, Duberstein, Coz, Herrmann, Forbes, & Caine (1996) found that 43% of adults aged 55-74 and 27% of adults aged 75-92 had alcohol abuse or dependence at the time of their suicide. The rate of substance abuse in older adults who have completed suicide indicates that substance use is an important component to be considered in suicide prevention.

Research suggests that the need for substance abuse treatment in the older adult population will grow in the upcoming years. A study by Gfroerer, Penne, Pemberton, & Folsom (2002) reviewed national drug abuse surveys to obtain estimates of the number of older adults who would need substance abuse treatment in 2020, and their research

concluded that there would be a 70% increase in treatment need from 2002 to 2020. Additional research estimates that 5.7 million older adults in the baby-boom cohort will have a substance abuse disorder in 2020 (Han, Gfroerer, Colliver, & Penne, 2008). This increase not only requires an increased amount of health professionals to serve this population, but also a continued development of quality measurement tools for substance abuse (Gfroerer, Penne, Pemberton, & Folsom, 2002).

Gender. The Centers for Disease Control and Prevention (2015a) present information and statistics about suicide and gender disparities. Although women have higher rates of suicidal ideation than men, men account for 78.9% of completed suicides (Centers for Disease Control and Prevention, 2015a). However, there is limited research on suicide ideation and behavior disparities by gender in the older adult population.

Research suggests that older men exhibit more confidence in suicidal behaviors than women, as evidenced by a higher percentage of completed suicides in men than women among those who attempt suicide (Dombrovski, Szanto, Duberstein, Conner, Houck, & Conwell, 2009). The increased rate of suicides in older adults is largely contributed to suicides among older men (Dombrovski et al., 2009). Statistical analysis shows that suicide rates in men increase dramatically at age 69 (Dombrovski et al., 2009).

Age. Research suggests that older age is a risk factor for suicide because older adults with depression receive treatment at lower rates than their younger counterparts (Waern, Rubenowitz, & Wilhelmson, 2003). A study of geriatric mental health treatment by Conner et al. (2010) concluded that stigma associated with mental illness was a strong deterrent for seeking out mental health treatment for depression in older adults, especially African American older adults. For those who do seek out treatment, research suggests that individuals are at risk for compromised self-esteem and opportunities for social interactions due to the stigma associated with receiving mental health care (Corrigan, 2004). Additionally, research shows that there is a lack of perceived need for mental health treatment in older adults, which results in this population being less likely to receive referrals for treatment (Klap, Unroe, & Unützer, 2003).

Physical health in later life also contributes to suicide risk in older adults. Research suggests that as many as 70% of adults age 60 and over with completed suicide had a physical illness that directly contributed to the suicidal act (Conwell, Duberstein, & Caine, 2002). Additionally, research presents serious physical illness as a risk factor strongly associated with suicide in men, but the correlation of serious physical

illness and suicide risk is not strong in women (Conwell, Duberstein, & Caine, 2002).

Research on Suicide Prevention

Although suicide is the 10th leading cause of death in the United States with over 40,000 cases in 2014, there are few evidence-based therapies that have been evaluated to assist in the treatment of suicidality (Kline, Chesin, Sonmez, Benjamin-Phillips, Beeler, Brodsky, & Stanley, 2015; Brown, Ten Have, Henriques, Xie, Hollander, & Beck, 2005). However, some studies have shown that cognitive behavior therapies can have a positive impact on reducing thoughts of suicide. According to Kline et al. (2015), research shows evidence that Dialectical Behavior Therapy (DBT), Cognitive Therapy for Suicide Prevention (CT-SP), and Mindfulness-Based Cognitive Therapy for Preventing Suicidal Behavior (MBCT-S) are interventions that have reduced suicide ideation in civilian, as well as military, populations. Research provides evidence that cognitive behavior therapies can also have a positive impact on reducing thoughts of suicide. A study by Brown et al. (2005) reported cognitive therapy as an effective intervention for reducing depression and hopelessness in a group of people who had recently attempted suicide. There has also been evidence of various suicide prevention programs that effectively lower the rate of suicide in older adults. For example, research has shown that older

adults who use telephone helplines have significantly fewer rates of suicide deaths (De Leo, Dello Buono, & Dwyer, 2002).

A group called International Research Group on Suicide Among the Elderly was created to review suicide prevention interventions for older adults (Erlangsen, Nordentoft, Conwell, Waern, et al., 2011). The panel agreed that there is a need for evidence-based interventions in universal, selective, and indicated prevention strategies (Erlangsen, Nordentoft, Conwell, Waern, et al., 2011). Additionally, this panel created a set of guidelines for suicide prevention in older adults, including research suggesting that the most effective programs for prevention will have a multifaceted approach (Erlangsen, Nordentoft, Conwell, Waern, et al., 2011).

A 2011 systematic review on interventions to reduce suicidality provides the foundation to establish a need for an updated study, to be undertaken in this thesis project. Lapierre (2011) analyzed 19 studies of interventions conducted from 1966-2009 that aimed to reduce suicidality in older adults age 60 years and older. Outcomes related to suicidality, as well as depression ratings were included (Lapierre, 2011). The findings revealed that interventions focused on the reduction of suicide risk in older adults have a positive effect on resiliency. One study, which was included in the systematic review, suggested that a randomized trial with depressed

primary care patients aged 60 and older who received 12 months of treatment consisting of an antidepressant prescription and Problem Solving Treatment in primary care showed a significant reduction of suicidal ideation throughout the study (Unutzer et al., 2006). Other interventions in the systematic review focused on improving protective factors to increase the well-being and resilience of older adults. For example, an 11-week program used a cognitive behavior approach with older adults who were having difficulty adapting to life after retirement, and results of the program showed decreased levels of psychological distress and depression (Lapierre, Dube, Bouffard, & Alain, 2007).

Summary

The purpose of this proposal is to synthesize the latest empirical research (2009-present) about suicide prevention programs in the older adult population by replicating the systematic review by Lapierre (2011). Suicide prevention programs around the world that are published in English will be included in the review. The replication of Lapierre's (2011) systematic review will also include research that was not captured in the original study related to service accessibility in terms of location, payment, and diverse populations. Service accessibility is an important component of this review because the Social Work Code of Ethics values social justice and equality of opportunity for all clients (NASW, 2016). The

rationale additions for this review are important because the effectiveness of suicide prevention programs for older adults must involve competent social work practitioners, as well as other professionals and community gatekeepers, who advocate for individuals in need of resources. Finally, the systematic review will provide the following implications for social work: continued research and development of effective mental health services; continued research on suicidal ideation and behavior; research and development of suicide assessments that are thorough and specific to the older adult population; and advocacy for suicide prevention programs for older adults.

Chapter 3: Methods

This thesis was a systematic review of 6 chosen databases and included studies from 2009 to 2016 regarding the effectiveness of suicide prevention programs on suicidal ideation, suicidal behavior, and completed suicides in the older adult population. This systematic review was a replication of the 2011 systematic review of older adult suicide prevention programs by Lapierre. Because of the increase in older adult suicides since 2011, the review done in 2011 was updated to synthesize newer information on the effectiveness of suicide prevention programs for older adults. Additionally, the review was updated to include research on service accessibility for older adult suicide prevention programs. In this study, PICO was used as a framework to identify a research question and to identify search guidelines for evidence based research. PICO is a structured protocol that was adopted by evidence-based practitioners who sought answers to clinical questions (Twa, 2016). PICO is an acronym that stands for Population (or Problem), Intervention, Comparison, and Outcome (Twa, 2016).

PICO Questions:

1) For older adults at risk of suicide, do suicide prevention programs for older adults reduce suicide ideation?

2) For older adults at risk of suicide, do suicide prevention programs for older adults reduce suicide behavior?

Systematic Search and Retrieval

A systematic search was conducted using various academic databases such as: AgeLine, Academic Search Complete, Medline, PsycINFO, Social Work Abstracts, and Social Service Abstracts. Additional inclusion criteria determined that: all literature reviewed must be published in English, the publish date was between January 2009 and December 2016, participants were over age 65, and the study outcome included a reduction in suicide ideation or behavior. Literature assessment included the following key words:

Terms that were used to identify the population of interest: “Older Adults” or “Elderly” or “Adults over age 65”. Additional intervention inclusion criteria were identified to include any program aiming to reduce suicidality: “Suicide Prevention” or “Suicide Reduction” + “suicide ideation,” “suicidal behavior,” or “death by suicide.” Comparison inclusion criteria were: “placebo,” “no treatment,” “treatment as usual (TAU),” and “waiting list control.”

Due to the limited research presented for a population of adults over age 65, the eligibility criteria was adapted to include adults over age 60. The systematic review by Lapierre (2009) made the same adaptation

to inclusion criteria based on a limited number of articles published with a population of adults over age 65.

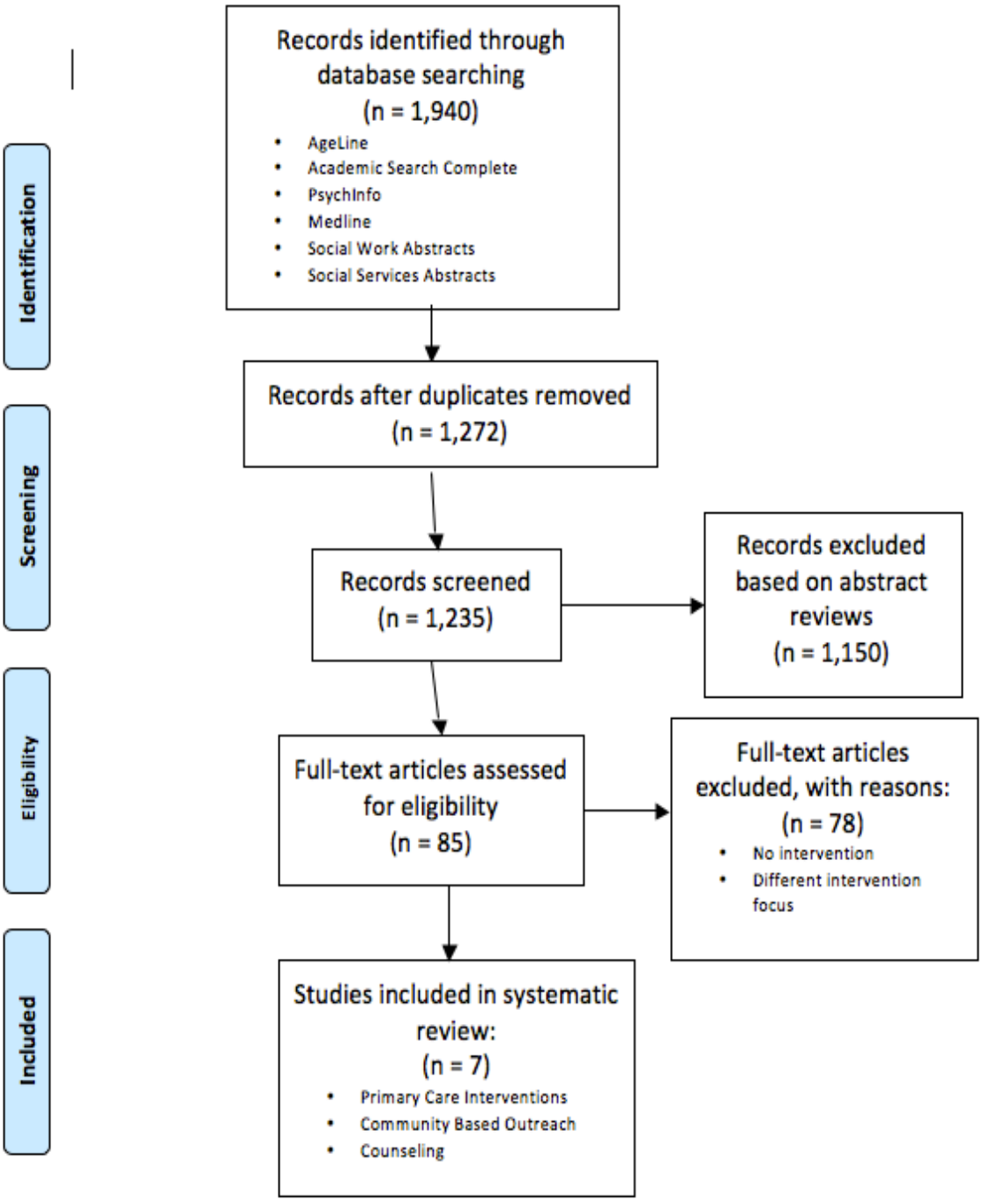
Organization of Data

The literature gathered from the search phase was organized and analyzed using PRISMA, which is an acronym that stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The PRISMA Statement is a 27-item checklist (see Appendix A) that is intended to simplify the process of gathering appropriate research and to improve the accuracy of reporting (Moher, Liberatik, Tetzlaff, Altman, & the PRISMA group, 2009). A PRISMA Flow Diagram (see Figure 1) was also used during the process of accessing research that meets all requirements for the systematic review (Moher, et al., 2009).

The Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) protocol was used to measure the quality of evidence found in studies retrieved in the search phase (GRADE Working Group, 2004). The GRADE protocol assisted in the assessment of: the level of strength of the studies, the importance of reported results, the comparison of harms and benefits, and the application of study outcomes (GRADE Working Group, 2004). In addition, the GRADE protocol was utilized in this systematic review to identify short and long-term effects of studies related to older adults and suicide prevention programs, and to

identify and compare the effectiveness of the various suicide prevention programs for this population.

Figure 1 PRISMA Flow Diagram



Chapter 4: Results

Study Selection

In this project, there were 1,940 studies screened from six chosen databases: 204 articles identified in AgeLine, 640 articles identified in Academic Search Complete, 615 articles identified in PsychInfo, 388 articles identified in Medline, 13 articles identified in Social Work Abstracts, and 80 articles identified in Social Services Abstracts. After duplicates were removed, there were 113 articles remaining from AgeLine, 395 remaining from Academic Search Complete, 383 from PsychInfo, 336 from Medline, 6 from Social Work Abstracts, and 39 from Social Services Abstracts. The number of articles screened after duplicates were removed totaled 1,272. All articles not written in English were then removed, which left 1,235 articles to be screened. A review of abstracts resulted in the exclusion of 1,150 articles. Reasons for exclusions included: participant age younger than 60, intervention not based on suicide prevention, and study results not indicating a reduction in suicide. After reviewing the abstracts, there were 85 articles remaining for full-text review. Full text reviews precipitated further exclusion of articles based on the following reasons: no intervention and/or intervention results not targeting suicide prevention. The final review of articles and the exclusion of non-relevant articles resulted in 7 articles to be included in the systematic review. The 7 articles included interventions in primary care, community based outreach, and counseling. Figure 1 presents a PRISMA Flow Diagram to illustrate the results of the systematic review. The PRISMA

Flow Diagram assisted in the process of collecting data from relevant articles based on eligibility guidelines presented Ch. 3, Methods.

Data Collection and Analysis

The seven articles to be included in the systematic review were assessed for sample size, population, problem treated, type of intervention, measures, and outcome. See Table 1 for an overview of the included studies.

Types of Interventions: Primary Care, Community Based Outreach, and Counseling

Primary Care Interventions. The systematic review identified three primary care intervention strategies for suicide prevention for older adults. The following three articles developed their intervention setting in primary care: “Outcomes of a Two-Tiered Multifaceted Elderly Suicide Prevention Program in a Hong Kong Chinese Community” by Chan, Leung, Tsoh, and Li (2011); “Reducing Suicidal Ideation and Depression in Older Primary Care Patients: 24-month outcomes of the PROSPECT Study” by Alexopoulos, Reynolds III, Bruce, Katz, Raue, Mulsant, Oslin, Ten Have, and PROSPECT Group (2009); and “Reducing Suicidal Ideation in Home Health Care: Results from the CAREPATH Depression Care Management Model” by Lohman, Raue, Greenberg, and Bruce (2016).

The study by Chan, Leung, and Li (2011) involved 66 suicide attempters age 65 and older in Hong Kong, China. An Elderly Suicide Prevention Program (ESPP) was implemented in seven areas in Hong Kong

using a two-tiered model. The first tier involved mostly primary care with community gatekeepers referring the suicide attempter to an appropriate service. A community referral begins a 6-month service with a care manager, who monitors the compliance and status of an individual's care. In this study, the pre-intervention cohort from the first tier was compared to the Elderly Suicide Prevention Program (ESPP) in the second tier. The second tier involved geropsychiatric services for 351 older adult suicide attempters. The ESPP cohort included gatekeeper training for the treatment of depression following attempted suicide and care management. Results indicated that the suicide rate was 1.99% in the ESPP cohort while the suicide rate was 7.58% in the pre-intervention cohort.

The study by Alexopoulos, Reynolds III, Bruce, Katz, Raue, Mulsant, Oslin, Ten Have, and PROSPECT Group (2009) involved 599 adults aged 60 and older with minor and major depression who participated in a care management intervention. The participants were randomly chosen after a pre-intervention screening in one of 20 of the involved primary care practices. Care managers trained in PROSPECT procedures were social workers, nurses, and psychologists. The 2-year PROSPECT intervention included depression symptom monitoring, and medication monitoring and management in the offices of medical practices and, if necessary, at a participants' home. The participants who declined prescription treatment were referred to interpersonal psychotherapy. Results indicate that 45.4% of participants in the intervention group had achieved remission from

depression after the 2-year PROSPECT treatment, while 31.5% of participants in the usual care group had achieved remission. This suicide prevention program demonstrated success because the participants in the intervention group had a greater decline in suicidal ideation over a 24-month period.

The study by Lohman, Raue, Greenberg, and Bruce (2016) involved 306 adults aged 65 and older who presented with depression after pre-intervention screening, utilizing the PHQ-2 measure. This study provided suicide prevention for older adults based on its objective of reducing suicide ideation and depression. The intervention involved CAREPATH – Depression Care for Patients at Home - while the treatment control involved enhanced usual care provided by nurses. After one year of the CAREPATH intervention, only 31.3% of participants continued to report suicide ideation, while 63.6% of participants in the control group continued to have suicidal ideation.

Community Based Outreach. The systematic review identified two community-based strategies for suicide prevention for older adults. The following two articles developed their intervention setting in the community: “A Community-Based Survey and Screening for Depression in the Elderly: The Short-Term Effect on Suicide Risk in Japan” by Oyama, Sakashita, Hojo, Ono, Watanabe, Takizawa, Sakamoto, Takizawa, Tasaki, and Tanaka (2010); and “Outcomes of Senior Reach Gatekeeper Referrals: Comparison

of the Spokane Gatekeeper Program, Colorado Senior Reach, and Mid-Kansas Senior Outreach" by Bartsch, Rodgers, and Strong (2013).

The study by Oyama, Sakashita, Hojo, Ono, Watanabe, Takizawa, Sakamoto, Takizawa, Tasaki, and Tanaka (2010) involved adults aged 60 and older in northern Japan. A random sample of older adults in 6 different rural municipalities produced a sample size of 1,345. An intervention cohort spanned three municipalities in the southern part of the region while a reference cohort spanned three municipalities in the northern part of the region. The intervention was implemented for two years. The first year of the intervention involved a self-administered anonymous questionnaire and a survey of depressive symptoms. The second year of the intervention involved intermittent depression screenings, interviews by nurses or social workers, referral to a psychiatrist, or referral to public health nurse of psychiatric social worker for follow up. In the intervention region, there was a 61% reduction in suicide risk among men 60 and older, while there was a 51% reduction in suicide risk among women 60 and older. The suicide reduction in female participants was not statistically significant.

The study by Bartsch, Rodgers, and Strong (2013) involved adults aged 60 and older in senior outreach programs in Colorado and Kansas. Colorado Senior Reach spanned five counties northwest of Denver. Mid-Kansas Senior Outreach (MKSO) served the Wichita, Kansas area. Community gatekeepers were trained prior to intervention. Community gatekeepers, both traditional and nontraditional, were trained about the

needs of older adults and how to connect with them. During intervention, the community gatekeepers made referrals for seniors in need of assistance. Colorado Senior Reach had 138 participants; after the 28-month intervention, suicide ideation in participants had decreased from 79.4% to 54.2%. Mid-Kansas Senior Outreach had 190 participants; after the 32-month intervention, suicide ideation in participants had decreased from 78.9% to 49.2%.

Counseling. The systematic review identified two counseling strategies for suicide prevention in older adults. The following two developed their intervention for the counseling setting: “Adapting Interpersonal Psychotherapy for Older Adults at Risk for Suicide” by Heisel, Talbot, King, Tu, and Duberstein (2015); and “Problem-Solving Therapy Reduces Suicidal Ideation in Depression Older Adults with Executive Dysfunction” by Gustavson, Alexopoulos, Niu, McCulloch, Meade, and Arean (2016).

The study by Heisel, Talbot, King, Tu, and Duberstein (2015) involved adults aged 60 and older in a medical center in Canada. 17 participants were chosen based on reports of suicide ideation, death ideation, or engagement in self-injury within last two years. The intervention provided 16 weeks of Interpersonal Psychotherapy adapted for older adults at risk for suicide. GSIS total scores presented significant reductions from pre- to post-treatment measurements.

The study by Gustavson, Alexopoulos, Niu, McCulloch, Meade, and Arean (2016) involved adults aged 60 and older with major depression in

San Francisco, California. In this study, 221 participants were randomly assigned to either 12 weeks of Problem-Solving Therapy (n=110) or 12 weeks of the treatment control, Supportive Therapy (n=111). The results indicate that the Problem-Solving Therapy cohort had a greater improvement in suicide ideation rate after 12 weeks (60.4%) than the Supportive Therapy cohort after 12 weeks (44.6%). Furthermore, results presented the effectiveness of Problem-Solving Therapy for the treatment of depression, disability associated with depression, and mild cognitive impairments.

Summary

In summary, the results of the study findings indicate that the suicide prevention interventions were implemented for an average of two years for the primary care and community-based intervention settings. In contrast, the average intervention time for the counseling setting was 14 weeks. A longer intervention time is not a necessity for client success, as indicated in the high success of the 12-week Problem Solving Therapy intervention. The sample size among the studies varied greatly, ranging from 17 participants to 1,345 participants. Overall, the results indicate that the primary care setting was very successful in implementing effective interventions for older adults with depression and suicide ideation (see Table 2 – GRADE).

TABLE 1 - OUTCOMES

Setting	Title	Authors	Sample Size	Population Treated	Problem Treated	Type of Intervention	Measures	Outcome
Primary Care Intervention	Reducing Suicidal Ideation and Depression in Older Primary Care Patients: 24-Month Outcomes of the PROSPECT Study	Alexopoulos, Reynolds III, Bruce, Katz, Raue, Mulsant, Oslin, Ten Have, and PROSPECT Group (2009)	599	Adults over age 60 with major or minor depression	Depression	monitoring depressive symptoms & medication side effects; interpersonal psychotherapy offered to patients who declined medication	24-item Hamilton Depression Rating Scale; Mini-Mental State Examination; Scale for Suicide Ideation	after 24 months, 45.4% of patients in intervention group had achieved remission
Primary Care Intervention	Reducing Suicidal Ideation in Home Health Care: Results From the CAREPATH Depression Care Management Trial	Lohman, Raue, Greenberg, and Bruce (2016)	306	Adults in New York over age 65 & screened positive on 2-item PHQ-2 depression screen	Suicide ideation	CAREPATH depression care management; Enhanced usual care was treatment control	baseline interview; Hamilton Rating Scale for Depression (Ham-D); Patient Health Questionaire (PHQ-2)	After one year of treatment, 31.3% of participats in CAREPATH group continued reporting suicide ideation, while 63.6% of usual care participants continued
Primary Care Intervention	Outcomes of a Two-Tiered Multifaceted Elderly Suicide Prevention Program (ESPP) in a Hong Kong Chinese Community	Chan, Leung, Tsoh, and Li (2011)	preintervention = 66; ESPP = 351	Adults over age 65 in Hong Kong Chinese community	Suicide prevention	preintervention group received psychogeriatric care after a suicide attempt; elderly suicide prevention program	two-year rates of completed suicide and suicide reattempt; changes in population suicide rates in the pre- and post-intervention periods	Two-year suicide rate was 7.58% in the preintervention group and 1.99% in the ESPP cohort
Community-Based Outreach	Outcomes of Senior Reach Gatekeeper Referrals: Comparison of the Spokane Gatekeeper Program, Colorado Senior Reach, and Mid-Kansas Senior Outreach	Bartsch, Rodgers, and Strong (2013)	Colorado Senior Reach = 138; Mid-Kansas Senior Outreach = 190	Adults over age 60 with suicide ideation and resided in specified county of Colorado or Kansas	Suicide ideation	community gatekeepers were trained to make referrals for older adults facing emotional distress	in-home assessment by professional care management and mental health staff, including isolation measure and Geriatric Depression Scale	Colorado Senior Reach: suicide ideation decreased from 79.4% to 54.2%; Mid-Kansas Senior Outreach: suicide ideation decrased from
Community-Based Outreach	A Community-Based Survey and Screening for Depression in the Elderly: The Short-Term Effect on Suicide Risk in Japan	Oyama, Sakashita, Hojo, Ono, Watanabe, Takizawa, Sakamoto, Takizawa, Tasaki, and Tanaka (2010)	41,337	Adults 60 and over in Japan	Suicide	survey, followed by depression screening and psychiatrist service	self-administered anonymous questionnaire; Center for Epidemiologics Studies Depression Scale (CES-D); Despression and Suicide Screen (DSS)	there was a 61% reduction in risk of suicide among men over age 60, and a 51% reduction in risk in women over 60 (not statistically significant)
Counseling	Adapting Interpersonal Psychotherapy for Older Adults at Risk for Suicide	Heisel, Talbot, King, Tu, and Duberstein (2015)	17	Adults 60 and over in Canada	Suicide risk	16 weeks of interpersonal psychotherapy (IPT) adapted for older adults at risk for suicide	Geriatric Suicide Ideation Scale (GSIS); Hamilton Rating Scale for Depression (Ham-D); Center for Epidemiologic Studies Depression scale-Revised (CESD-R); Psychological Well-Being Scale (PWB); Social Adjustment Scale Self Report (SAS-SR); Duke Social Support Index (DSSI); Working Alliance Inventory (WAI)	significant pre- to post-intervention reductions were observed for Geriatric Suicide Ideation Scale (GSIS) scores
Counseling	Problem-Solving Therapy Reduces Suicidal Ideation in Depressed Older Adults with Executive Dysfunction	Gustavson, Alexopoulos, Niu, McCulloch, Meade, and Arean (2016)	221 total; Problem-Solving Therapy = 110; Supportive Therapy = 111	Adults over age 65 with major depression without psychotic features in San Francisco, California	Suicide ideation	Problem Solving Therapy (PST); Supportive Therapy (ST) was treatment control	secondary data analysis; Mattis Dementia Rating Scale; Hamilton Depression Rating Scale	PST group showed higher rate of suicide ideation improvement (60.4%) after 12 weeks than ST group (44.6%) after 12 weeks

Quality of Evidence: GRADE

Study quality and treatment effectiveness was analyzed with the application of the GRADE protocol. The seven articles included in the systematic review were assessed for quality and rated in the following areas: design, quality, consistency of results, directness of evidence, precision of data, and reporting bias.

Interventions that were designed as a randomized control trial were given the rating “high,” while the interventions with an uncontrolled trial or cohort study were given the rating “low.” Two articles out of three that were given the “low” rating for design quality were eventually given the overall GRADE rating of “Low quality.”

The next GRADE rating was for the quality of the chosen study design. A positive rating was given when the study built on previous research and/or used previously tested measurements. Three articles were given a negative rating in this section due to new intervention strategies.

The following GRADE rating was based on consistency of results after program interventions. High ratings were given to studies that demonstrated strong, consistent outcomes across intervention and control cohorts. Low ratings were given to two studies for inconsistent results. GRADE also examines directness of evidence in outcomes of published studies. All of the studies identified in this systematic review were rated as having evidence that was easy to view and understand.

Table 2 - GRADE

Setting	Article	Authors	Design	Quality	Consistency of Results	Directness of Evidence	Precision of Data	Reporting Bias	GRADE
Primary Care Intervention	Reducing Suicidal Ideation in Home Health Care: Results From the CAREPATH Depression Care Management Trial	Lohman, Raue, Greenberg, and Bruce (2016)	(High) Randomized Control Trial	(+1) the intervention was previously demonstrated to significantly reduce depressive symptoms	(+1) suicide ideation decreased significantly in both intervention groups	(+2) clear reporting of intervention results that identify the intervention group being more successful than the control group	(+1) no significant differences in demographic or clinical variables	(+1) low probability of reporting bias	High quality
Counseling	Problem-Solving Therapy Reduces Suicidal Ideation in Depressed Older Adults with Executive Dysfunction	Gustavson, Alexopoulos, Niu, McCulloch, Meade, and Arean (2016)	(High) Randomized Control Trial	(+1) PST modification adapted from the Nezu manual	(+2) participants were more likely to experience a decrease in suicidal ideation with PST than with ST, both during treatment and 6 months post-treatment	(+2) clear reporting of intervention results that identify the intervention group being more successful than the control group	(+1) no significant differences in demographic or clinical variables; no differences in key indicators	(-1) unknown probability of reporting bias	High quality
Primary Care Intervention	Reducing Suicidal Ideation and Depression in Older Primary Care Patients: 24-Month Outcomes of the PROSPECT Study	Alexopoulos, Reynolds III, Bruce, Katz, Raue, Mulsant, Oslin, Ten Have, and PROSPECT Group (2009)	(High) Randomized Control Trial	(-1) first study of depression care management focusing on suicidal ideation and depressive psychopathology in older primary care patients over a 24 month period	(+2) The decrease in HAM-D score from baseline was greater in the intervention group than in the usual-care group at all assessment points	(+2) clear reporting of intervention results that identify the intervention group being more successful than the control group	(+1) no significant differences in demographic or clinical characteristics between intervention group and control group	(+1) low probability of reporting bias	High quality
Community-Based Outreach	Outcomes of Senior Reach Gatekeeper Referrals: Comparison of the Spokane Gatekeeper Program, Colorado Senior Reach, and Mid-Kansas Senior Outreach	Bartsch, Rodgers, and Strong (2013)	(Low) cohort study	(+1) this study built on previous research by using similar measurements outcomes of study programs	(+1) paired sample t-tests showed statistically significant in almost all isolator ratings for Colorado Senior Reach and Mid-Kansas Senior Outreach	(+2) clear reporting of intervention results that identify the intervention groups successfully reducing suicide ideation	(+1) differences among programs were not statistically significant	(-1) unknown probability of reporting bias	High quality
Primary Care Intervention	Outcomes of a Two-Tiered Multifaceted Elderly Suicide Prevention Program (ESPP) in a Hong Kong Chinese Community	Chan, Leung, Tsoh, and Li (2011)	(Low) cohort study	(+1) study design similar to other primary care interventions	(-1) suicide reduction was consistent for age 65-85 after ESPP, but not for age 85 and older	(+1) clear reporting of intervention results that identify the intervention age-range success	(-1) inconsistencies in data	(-1) bias towards female sex for implications of suicide prevention in older adults	Low quality
Counseling	Adapting Interpersonal Psychotherapy for Older Adults at Risk for Suicide	Heisel, Talbot, King, Tu, and Duberstein (2015)	(Low) Uncontrolled Trial	(-1) pilot study with intervention adapted for older adults at risk for suicide	(+2) significant pre- to post-treatment reductions observed for GSIS suicide ideation and CESD-R scales	(+2) clear reporting of intervention results that identify the intervention group successfully reducing suicide ideation	(-1) significant variance in demographics	(-1) probability of reporting bias based on small sample size	Low quality
Community-Based Outreach	A Community-Based Survey and Screening for Depression in the Elderly: The Short-Term Effect on Suicide Risk in Japan	Oyama, Sakashita, Hojo, Ono, Watanabe, Takizawa, Sakamoto, Takizawa, Tasaki, and Tanaka (2010)	(Low) Nonrandomized Trial	(-1) no indication of intervention tested previously	(-1) results were inconsistent pre- and post-intervention for intervention and reference cohorts	(+1) clear reporting of intervention results that identify the intervention year success	(-1) inconsistencies in data	(-1) unknown probability of reporting bias	Low quality

Chapter 5: Discussion

The systematic review presented 7 out of the 1,235 studies screened to have a suicide prevention or intervention program for older adults that fit the eligibility criteria for inclusion. Compared to the systematic review by Lapierre (2011) that included 19 studies on older adult suicide prevention, this review presented a lack of diversity in intervention settings because it contained three types of intervention settings while the Lapierre (2011) review contained five types of intervention settings. This review shared three of the same intervention settings as the replicated study such as: primary care interventions, community based outreach, and counseling. However, this review lacked articles with interventions presented in the study by Lapierre (2011) such as telephone counseling and improved resilience.

The research questions for this systematic review were: For older adults at risk of suicide, do suicide prevention programs for older adults reduce suicide ideation? For older adults at risk of suicide, do suicide prevention programs for older adults reduce suicide behavior? Results from the 7 retrieved articles indicate that all of the interventions reduced suicide ideation or suicide behavior. However, these findings should be interpreted cautiously as all of the studies had limitations as identified by the GRADE analysis including: reporting bias, nonrandomized study design, inconsistency in results, inconsistencies in data, low design quality, and variance in demographics (see Table 2 – GRADE).

The main findings of this review include the results of the GRADE protocol. The study by Lohman, Raue, Greenberg, and Bruce (2016) had a high quality GRADE rating and used the CAREPATH home health care management intervention to reduce suicidal ideation in adults age 65 and above. This intervention involved participants who had indications of depression, and the participant changes throughout the intervention were compared to participants in a control group. The study by Gustavson, Alexopoulos, Niu, McCulloch, et al. (2016) also had a high quality GRADE rating and used an adapted form of Problem Solving Therapy in a counseling setting for adults age 65 and above. This intervention involved participants who were identified to have major depression without psychotic features. The third study with a high quality GRADE rating was by Alexopoulos, Reynolds, Bruce, Kats, et al. (2009). This study used a primary care intervention to monitor and reduce depression and suicide ideation in adults age 60 and above. The fourth and final study with a high quality GRADE rating was by Bartsch, Rodgers, and Strong (2013) and built on a previous community gatekeeper program; the gatekeepers provided community referrals to adults age 60 and above who had emotional distress suicide ideation.

Of the studies evaluated to be included in the results, three studies had notable limitations and were given a low quality GRADE rating. First, the study by Chan, Leung, Tsoh, and Li (2011) presented several significant limitations. The study design had low quality because the sample size was a

cohort. The results were inconsistent in the participant age cohort of 85 and older. There were also inconsistencies in the precision of data. Finally, there was a reporting bias towards the female sex for implications of suicide prevention in older adults. Next, the study by Hesiel, Talbot, King, et al. (2015) presented with several limitations such as: an uncontrolled trial design, the intervention was a pilot study, there was a significant variance in demographics, and a probability of reporting bias due to a small sample size. Lastly, the study by Oyama, Sakashita, Hojo, et al. (2010) presented several limitations. The intervention quality was given a low quality grade because there was no indication that the intervention had been tested previously. The results of the study were inconsistent for both the intervention and reference cohorts. Also, there were inconsistencies in data reporting and unknown probability of reporting bias.

It is interesting to note that the four studies with high quality GRADE ratings had interventions in a variety of settings: home health, counseling, primary care, and community. Therefore, this research supports a variety of effective suicide prevention models for older adults. Additionally, the studies that involved a variety of professionals and community members were most effective. The research also supports a variety of ages between 60 and 85+.

Service Accessibility

This study incorporated an analysis of service accessibility, which was not included in the previous review by Lapierre (2011). The topic was chosen to be added to this review because accessibility of services is an integral part

of advocacy for the well being of older adults. Analysis of the results of the systematic review provides insight into the levels of accessibility for the study participants including location of the intervention, cost/payment of the intervention, and inclusion of diverse populations in the intervention.

Location. The studies in this systematic review were tested in various settings around the world, such as China, Japan, Canada, Colorado, Kansas, California, and New York. The community-based study by Oyama, Sakashita, Hojo, et al. (2010) provided service primarily to six rural municipalities in northern Japan. On the other hand, the primary care study by Alexopoulos, Reynolds, Bruce, et al. (2009) may have been unable to reach a rural population due to the treatment location being in 20 different primary care offices. The diversity of location of the participants in this study is unknown.

A few programs were accessible specifically because they offered in home services. For example, the gatekeeper referral programs presented in the study by Bartsch, Rodgers, and Strong (2013) provided assessments in the homes of the participants. Additionally, the CAREPATH depression care management trial provided its intervention through home health care and represented six different geographic regions in the United States (Lohman, Raue, Greenberg, and Bruce, 2016).

Payment. There are several different funding sources represented in the studies included in this systematic review. The elderly suicide prevention program tested in a Hong Kong community received its funding from the

Chinese government (Chan, Leung, and Tsoh, 2011). Meanwhile, some programs were funded by university grants, including the study by Gustavson, Alexopoulos, Niu, et al. (2016). An additional funding source was Medicare; participant eligibility was provided through Medicare for the home health intervention by (Lohman, Raue, Greenberg, and Bruce, 2016). The funding sources made available for the above research projects provided suicide prevention interventions for over 850 participants at no cost. Financial accessibility is integral to suicide prevention efforts because it does not exclude an individual from needed services based on their income. Many older adults live on limited incomes and have other health needs that require payment.

Diverse Populations. Previous research on older adult suicide has indicated greater efficacy of prevention efforts in the women verses men. However, the results of this systematic review present research on greater success in suicide risk reductions in older adult men. The reduction of suicide risk in males was shown to be statistically significant in the rural community intervention of Japan – there was a 61% reduction in risk of suicide among men over 60 (Oyama, Sakashita, Hojo, et al., 2010). This is important because it provides evidence that a suicide prevention intervention for older adult males can also be effective. This research suggests that older men benefit from a different intervention method than older women for the reduction of suicide ideation and behavior.

Ethnic diversity should also be represented in suicide prevention efforts. The primary care study by Alexopoulos, Reynolds, Bruce, et al. (2009) reported almost one third of its participants being represented by minority groups and 71.6% of the participants were women. Meanwhile, other studies lacked diversity in their participant population. For example, the study by Oyama, Sakashita, Hojo, Ono, et al. (2010) did not report any ethnic diversity in its participant population, which may be a limitation due to nonrandomized assignment of the participants to the intervention program. Other studies did not report demographics of participants. This limitation is important for social work research because equal opportunity for services is be a primary goal for research across diverse populations.

Study Limitations

This study presented several limitations, including limitations due to the researcher's methods. For example, the review excluded all studies not published in English, which may have limited the results of the study. The review also excluded non peer-reviewed journals, which may have limited the accessibility of other effective suicide prevention studies. Additionally, the review contained personal bias because there was only one researcher reviewing the articles and establishing the GRADE ratings. Despite the study limitations, the study has strengths because the review had strict inclusion criteria and produced the most relevant studies evaluating the effectiveness of suicide prevention interventions on suicide ideation and behavior among older adults.

Implications

The results of this systematic review present a number of implications for research and practice. First, this review provides a direction for continued research and development of effective mental health services for older adults because the review presents four suicide prevention studies with a high quality GRADE rating. Three out of the four articles given the high quality GRADE rating provided their suicide prevention intervention in the primary care setting. Research suggests that clinicians prefer providing integrated care for mental health treatment, and interventions for older adults in primary care settings have improved patient health outcomes (Gallo, Zubritsky, Maxwell, Nazar, et al., 2004). Additionally, this review suggests that a combination of treatment settings with several professions working in unison is beneficial for effective prevention of suicide in older adults. For example, the study by Alexopoulos, Reynolds, Bruce, et al. (2009) provided counseling care for their participants in the primary care setting, therefore combining the setting of counseling with primary care. The study by Lohman, Raue, Greenberg, and Bruce (2016) provided a primary care intervention in the participants' homes, therefore joining the primary care setting with the community-based outreach setting. Lastly, the study by Chan, Leung, Tsoh, and Li (2011) combined the primary care setting with the counseling setting by providing psychogeriatric care to the participants.

Recommendations

Suicide prevention research should continue to involve assessment, treatment, and management of mood disorders (Lapierre, 2011). Study findings point to the need for continued research on suicide ideation and behavior in older adults – how can suicide ideation and behavior be identified? Further research and development of suicide assessments that are thorough and specific to the older adult population would be beneficial to suicide prevention efforts. Research suggests that continued studies on the effectiveness of suicide assessments, such as the Reasons For Living – Older Adults Scale, will allow practitioners to be adequately equipped to treat older adults presenting with suicide ideation and behavior (Edelstein, Hesiel, McKee, Martin, Koven, Duberstein, & Britton, 2009).

Social work practitioners have a professional responsibility to advocate for the welfare of all populations. Social workers in the field of gerontology can be involved in advocacy for suicide prevention education and efforts in their location of service. Social workers can also work to address risk factors for older adult suicide, including depression, social support, substance abuse, and sex. Training opportunities, including the required Continuing Education Units (CEUs), should involve training for social workers in primary care settings with older adults.

Additionally, social work practitioners should be sensitive to the vulnerabilities of the male population in regards to suicide risk, suicide identification, and suicide treatment. Research suggests that few efforts have

focused specifically on suicide prevention strategies for males, which sustains the issue of service availability of effective treatments in the male population (Bilsker & White, 2011). It is important to note the differences in suicide method for males, who are more likely to choose hanging or suffocation as suicide method, in future suicide prevention efforts (Tsirigotis, Gruszczynski, & Tsirigotis, 2011).

Social work practitioners also have the ethical responsibility to advocate for the accessibility of needed services. Community professionals should be committed to offering accessible suicide prevention interventions for older adults in various locations, at reasonable rates, and to diverse populations. A commitment to providing accessible and affordable suicide prevention programs is an integral component of social justice efforts for at-risk older adults. Furthermore, the NASW Code of Ethics states that social workers have a responsibility to promote social justice for clients served (NASW, 2016).

Conclusions

The results of this systematic review are comparable to the replicated study by Lapierre (2011). For example, several of the articles in this review included a multifaceted approach to suicide prevention in their study area, and Lapierre's (2011) study also had multifaceted models of intervention and treatment. This review provides information about the most recent interventions that have been tested for the effective reduction of suicide ideation and behavior in older adults in various parts of the world. The

pursuit of various treatment methods and frameworks in research suggest that diversity of effective suicide prevention interventions is important for mental health in the older adult population. This review did not yield studies that included important components of suicide prevention suggested by Lapierre (2011) such as: family involvement, telephone counseling, and suicide means restriction. Thus, future research continues to be needed in these areas. Finally, findings from this systematic review suggest that there are many future areas for research and practice in which families, communities, and professionals can be more knowledgable about and prepared for suicide ideation, suicide behavior identification, and suicide prevention in the older adult population.

Appendix A

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

Table 1. **Checklist of Items to Include When Reporting a Systematic Review or Meta-Analysis**

Section/Topic	Item #	Checklist Item	Reported on Page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers).	
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

Appendix B

Criteria for GRADE

Criteria for GRADE
Grades of Recommendation, Assessment, Development, and Evaluation

Type of evidence:
Randomized trial = high
Observational study = low
Any other evidence = very low

Decrease grade if:

- Serious (-1) or very serious (-2) limitation to study quality
- Important inconsistency (-1)
- Some (-1) or major (-2) uncertainty about directness
- Imprecise or sparse data (-1)
- High probability of reporting bias (-1)

Increase grade if:

- Strong evidence of association-significant relative risk of >2 (<0.5) based on consistent evidence from two or more observational studies, with no plausible confounders (+1)
- Very strong evidence of association-significant relative risk of >5 (<0.2) based on direct evidence with no major threats to validity (+2)
- All plausible confounder would have reduced the effect (+1)

Definitions of grades of evidence

- **High** = Further research is unlikely to change our confidence in the estimate of effect.
- **Moderate** = Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- **Low** = Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- **Very Low** = Any estimate of effect is very uncertain.

(GRADE Working Group, 2004)

Appendix C

Terms Defined

Placebo: A substance or treatment that is fake, used as a control to test the effectiveness of an experiment

Suicide: death caused by self-directed injurious behavior with an intent to die as a result of the behavior (Centers for Disease Control and Prevention, 2016)

Suicidal behavior: actions to harm oneself with the intent to end life; may involve a weapon such as a gun or knife, or other item to induce harm such as a rope, water, or car

Suicidal ideation: also known as suicidal thoughts; thoughts about killing oneself, which can be a detailed plan or a brief thought; does not always lead to suicidal behavior

Suicide prevention: the efforts of citizens, organizations, and health professionals to diminish the risk of suicide

Treatment as usual (TAU): A group of participants determined to maintain a standard protocol or procedure

Waiting list control: A group of participants assigned to a waiting list during a study to be a comparison to the treatment group; these participants receive treatment following the study

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Biographical Information

Marissa Wallace earned her Bachelor of Science in Social Work from the University of Texas at Arlington (UTA) and her Master of Science in Social Work with Direct Practice in Aging Services from the University of Texas at Arlington (UTA). Her Graduate Research Assistant (GRA) position involved the following study: Shakespeare and Robots: Examining the Impact of a Theatre Intervention on Psychological Well Being in Older Adults. She completed two internships during her studies as a Case Management intern at Catholic Charities, Inc. and a Medical Social Work intern at Angel Hands and ICON hospice agencies. Her future plans involve direct practice with older adults in mental health and health care settings. Marissa's research interests include: Gerontology, mental health, and healthcare.