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The Effects of Collaborative-Care Training on Paraprofessional Case Managers' Perceived Self-Efficacy, Knowledge, and Behaviors for Depression-Related Services Delivery

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Author
Landry, Craig M.

Publication Date
2014

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UNIVERSITY OF CALIFORNIA

Los Angeles

The Effects of Collaborative-Care Training on Paraprofessional Case Managers’ Perceived Self-Efficacy, Knowledge, and Behaviors for Depression-Related Services Delivery

A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Social Welfare

by

Craig Martin Landry

2014
ABSTRACT OF THE DISSERTATION

The Effects of Collaborative-Care Training on Paraprofessional Case Managers’ Perceived Self-Efficacy, Knowledge, and Behaviors for Depression-Related Services Delivery

BY

Craig Martin Landry

Doctor of Philosophy in Social Welfare

University of California Los Angeles 2014

Professor Aurora P. Jackson Chair

Depression is one of the leading causes of disability in the world and affects about 10 percent of adults in the United States. Under-resourced communities of color often have low access to professional providers of evidence-based depression care. The purpose of this dissertation was to compare the effectiveness of a community engagement intervention across social service agencies relative to a more traditional technical assistance based training implementation strategy on participation in training and delivery of collaborative depression care by paraprofessional case managers in two low-income communities in Los Angeles. The direct effects of training participation versus no participation under both intervention conditions on depression care services delivery by paraprofessional case managers was also evaluated. Case managers in agencies assigned to the intensive training condition (experimental group) were more likely than their
counterparts in agencies assigned to the technical-assistance-only control group to participate voluntarily in the training sessions at their agencies. They also were more likely to score higher at posttest on measures of use of evidence-based problem-solving strategies, use of depression-oriented outreach activities, and amount of time spent delivering direct depression care services. No significant differences were found with regard to knowledge about depression, attitudes toward people with depression, and perceived barriers to providing depression services. The conclusion addresses the results broadly and suggests some implications for policy, practice, and future research.
The dissertation of Craig Martin. Landry is approved.

Yeheskel (Zeke) Hasenfeld
Robert Schilling
Kenneth Wells
Aurora P. Jackson Committee Chair

University of California Los Angeles

2014
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CHAPTER I

INTRODUCTION

In a given year, depressive disorders affect 9.5 percent of the U.S. population, age 18 years or older, with major depression being the leading cause of disability in the U.S. for adults (Kessler RC, 2005). The World Health Organization estimates that by 2020, depression will be the second leading cause of disability worldwide, second only to heart disease (Mark, Shern, Bagalman, & Cao, 2007; "Mental Health ", 2009). Depression occurs in people of all backgrounds, ages, and genders (Bruce, Smith, Miranda, Hoagwood, & Wells, 2002), has a synergistic effect on many chronic illnesses such as diabetes, negatively impacts the quality of lives, and dramatically increases the cost of health care. In the year 2000, the overall economic burden of depression was estimated at 83 billion dollars (Greenberg et al., 2003).

Although the evidence suggests that African Americans are less likely than whites to have a major depressive disorder, when they do, it tends to be more chronic and severe (Williams et al., 2007). It is well documented that African Americans with a major depressive disorder are much less likely than whites to undergo treatment; and when they do, they are much less likely to receive evidence-based care (Riolo, A Nguyen, A Greden, & A King, 2005; Williams et al., 2007). Williams and colleagues (2007) report that 10.4 percent of mostly poor African Americans suffer from a major depressive disorder (Riolo et al., 2005; Williams et al., 2007). Relative to others they are more likely to rate their depression as severe and disabling; less likely to use mental health services; and, when they do, more likely to terminate treatment early (Wells, 1999,
Studies have shown that the use of evidence-based interventions can lead to improved use of treatments for depression in primary care settings (Miranda Jeanne et al., 2003). How to implement such interventions in low-income communities of color is poorly understood.

The Partners in Care (PIC) study—a group-level randomized trial of implementation of quality improvement for depression in primary care, compared to usual care—tested the effectiveness of an intervention developed to improve care for primary care patients with depressive disorders in private and public managed care practices in four geographic areas of the United States (Wells, 1999). The intervention was based upon the principles of the Chronic Care Model and has demonstrated effectiveness with people of color (Miranda, Schoenbaum, Sherbourne, Duan, & Wells, 2004; Wells et al., 2004). The Chronic Care Model (CCM) is a collaborative, systematic approach to care in which the definition of the problem, the development of the care plan, and the parameters of patient follow-up are negotiated in terms that both the patient and health care team understand (Connelly, Baker-Ericzenm, Hazen, Landsverk, & Horwitz, 2010; Katon, 2003; Kilo, 1998). The health care team is often comprised of a physician, a professional care manager and access to a physician specialist such as a psychiatrist (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006). The Chronic Care Model is a systems approach based on a synthesis of the best available evidence rather than an explanatory theory (Wagner et al., 2001). According to this model, improved depression care involves engaging and motivating patients, monitoring their treatment adherence, and tracking outcomes, while also providing education and assistance with problem solving. In carrying out such functions, professional care managers are an important link
between the treatment team and patients and, as such, they are an integral component of the Chronic Care Model.

Healthcare systems in under-resourced low-income and minority communities often have a low availability of professional care managers such as nurses and professional social workers. Thus, in these communities, one approach to improving depression care might be through the substitution of paraprofessional case managers and outreach workers for professional care managers. Evaluating this potential requires developing and implementing this alternative role within the collaborative care model and examining effectiveness of the transformed delivery model as well as of the training specifically of nonprofessionals on depression services competencies.

Case management, which has been described as the very cornerstone of community mental health (Holloway, 1991; Kanter, 1989), represents a major innovation in the delivery of mental health care (Holloway & Carson, 2001). Case management is defined in several ways in the literature. For example, the Case Management Society of America defines case management as a collaborative process of assessment, planning, facilitation and advocacy for options and services to meet an individual's health needs through communication and available resources to promote quality cost-effective outcomes (America, 2008). Others have defined case management as a set of logical steps, whereby a client receives needed services in a supportive, efficient, and cost effective manner (Weil and Karls, 1985). Kanter (1989) defines clinical case management as a modality of mental health care practice that, in coordination with the traditional psychiatric focus on biological and psychological functioning, addresses the need for overall maintenance of the mentally ill person’s physical and social environments with
the goals of facilitating his or her physical survival, personal growth, community participation, and recovery from or adaptation to mental illness. In short, case management can be described as a modality of practice that addresses the biopsychosocial needs of individuals in the context of their social environments. As such, skills that include client engagement and relationship formation in order to facilitate efficacious problem solving are important. Many of these functions are similar to those carried out by professional care managers in the Chronic Care model which is one approach to collaborative care in health systems.

Some have found, however, that paraprofessionals tend to ground their practices in their day-to-day experiences rather than established theory or empirically based treatments (Rhode & Nehls, 1996). Others have argued that they can be effective in delivering intervention services to people with depressive symptoms (Boer, Wiersma, Russo, & Bosch, 2005). Because low-income and minority communities have insufficient resources for treating individuals needing depression care (Boer et al., 2005), paraprofessionals are called upon to fill this void in settings such as senior centers, substance abuse agencies, homeless shelters, as well as faith-based and general purpose social service organizations, all of which play roles either formally or informally in delivering services to persons with depression in the community. It has been reported by some that paraprofessionals have traditionally made up about 50 percent of the mental health care manpower by serving in a variety of capacities, including crisis intervention (Moffic, Patterson, Laval, & Adams, 1984).

The term paraprofessional describes an entire category of mental health personnel not identified as psychiatrist, psychologist, social worker, or nurse. This group of providers
generally has less than a masters degree and those occupying such roles usually are supervised by mental health professionals (Moffic et al., 1984). Paraprofessionals often are indigenous workers who serve as links between agencies and the community (Grant, Ernst, AP., Phipps, & Gendler, 1996). Some have argued that the use of paraprofessionals in treatment naturally fosters consumer involvement, empowerment, and self help; features that are believed to have important therapeutic effects (Bedell, Cohen, & Sullivan, 2000). Others (Durlak 1979 Hattie, Sharpely, & Rogers, 1984) have found that paraprofessionals can achieve outcomes equal to or significantly better than those obtained by professionals. However, the effectiveness of depression care approaches that aim to improve paraprofessional case managers’ use of evidence-based outreach and intervention practices in low-income, minority communities of color have not been adequately tested.

The purpose of this dissertation was to test the efficacy of a community engagement intervention on the delivery of collaborative depression care by paraprofessional case managers in two low-income communities in Los Angeles (Hollywood-Metropolitan & South Los Angeles) with large numbers of African American and Hispanic families. Data gathered as part of an ongoing study (Community Partners in Care) carried out by Kenneth Wells and his colleagues (2006) that involved a training program that was designed and carried out by Landry (see Method section) were used.

Community Partners in Care (CPIC) is a collaborative research project of community and academic partners working together to learn the best way to reduce the burden that depression places on low-income communities and vulnerable populations in South Los Angeles (Wells 2006). It was designed to build on the methods and findings of the
Partners in Care study mentioned earlier. CPIC is a group-level randomized controlled trial of the effectiveness of a community engagement, network-development implementation intervention versus expert consultation through time-limited technical assistance, in stimulating uptake across diverse community agencies of evidence-based quality improvement programs for depression. For this dissertation, 117 paraprofessional case managers comprise the sample; i.e., 58 case managers were from agency programs that were assigned randomly to the experimental group and participated in intensive training utilizing an approach to depression care informed by the Chronic Care Model, and 59 case managers were from programs that were assigned randomly to the control group and got technical assistance only.

No prior US studies have examined the implementation of collaborative care for depression services across diverse healthcare, social services and other community-based organizations in under-resourced communities that often rely extensively on paraprofessional case managers to coordinate diverse health and social services. This dissertation has taken a novel approach to the evaluation of a collaborative care intervention for depression treatment. The intervention was designed to promote co-ownership, responsibility, and leadership in the delivery of evidence-based services in several community-based agencies in two low-income communities. This community engagement approach (CE) utilizes a set of principles to build trust, ensure an equal voice and knowledge exchange among all stakeholders (L. Jones & Wells 2007). It derives from a community participatory action model implemented in the United States largely within social work (Rothman, 1996) and now is an approach recommended by the
Institute of Medicine and National Institutes of Health to address health disparities (Thomas, Quinn, Butler, Fryer, & Garza, 2011).

Community Partners in Care (CPIC) builds on the Partners in Care study mentioned earlier, as well as on other studies about the effectiveness of collaborative care (J. Unutzer et al., 2001) and of depression treatment in minority communities (Miranda et al., 2006). Collaborative care has been shown to be more effective than usual care in the treatment of depression in both the short and long terms (Simon, Gilbody, Peter, Bower, Janine, Fletcher, David, Richards, & Sutton, 2006).

Although the collaborative care trainings under each implementation intervention protocol were open to all staff with direct patient contact in all participating agencies, including nonprofessional case managers and health workers, the present study focused only on paraprofessional case managers; that is, case managers whose programs were assigned randomly either to the experimental or intense community engagement and planning (CEP) condition or to the “standard” or control implementation condition that offered time-limited technical assistance through an expert training team (RS). The trainings were offered at the community sites between the months of April and September 2010.

In the present study, the experimental community engagement condition was designed to encourage community agencies, leaders, and service providers to participate in collaborative care for depression by using principles of community engagement that develop trust through sharing power and authority, emphasize relationship-building, and support development of community capacity through two-way knowledge exchange
(Jones and Wells, 2007; Wells and Jones 2009). As a part of the community engagement and planning experimental condition, paraprofessional case managers were asked to participate in a training that focused on how to engage prospective clients, form helping relationships, recognize depressive symptoms, make efficacious referrals, and carry out a problem solving intervention. In contrast, the technical assistance intervention (the control condition) was delivered with an emphasis on knowledge transfer and respect, but not on community engagement and relationship building. It was hypothesized at the outset that the community engagement experimental condition would be associated with increased participation in collaborative care training as well as greater uptake of strategies covered in the training for use in actual practice. This study addressed three main questions.

1. Can paraprofessional case managers be trained to deliver evidence-based depression support services similar to those described for professional case managers in the literature?

2. What are the effects of an intensive community engagement and planning implementation condition versus a time-limited technical-assistance-only implementation condition on paraprofessional case managers’ willingness to engage in evidence-based intervention strategies in the delivery of depression services in community settings?

3. What are the effects of actual exposure to evidence-based case manager training across the implementation intervention conditions on paraprofessional case managers’ use of problem-solving techniques for depression practice interventions, on the
enhancement of their knowledge about depression, and on their attitudes toward the
delivery of services to people with depressive symptoms?

In the hypotheses that follow, outcomes are considered primary if they reflect the
main goals of the intervention. It was hypothesized at the outset that paraprofessional
case managers who were exposed to the intensive community engagement
implementation intervention (experimental group), compared to those who got the
technical-assistance-only implementation intervention (control group), would
demonstrate:

1. Greater participation in evidence-based depression care training, as indicated by
   outcomes of the following hypotheses.

2. Higher scores at posttest on self-reported measures of evidence-based problem-
solving intervention strategies, including depression-oriented outreach and case
   management activities (primary outcomes).

3. Greater participation at posttest in delivering services in community-based
   settings (primary outcome) as indicated by the amount of hours of services
   delivered in a community setting.

4. Higher scores at posttest on measures of perceived knowledge about depression,
   and on measures of positive attitudes toward outreach and service delivery to
   people with depressive symptoms, as well as toward clients experiencing
   depression (secondary outcomes).

5. Fewer perceived barriers at posttest within their local environment with regard to
   providing depression services (secondary outcome).

The implementation intervention conditions for this study were assigned
randomly at the program level and participating providers had the option of participating or not in the study activities. This permitted the hypotheses above to be examined using an experimental design within an intent-to-train framework. This form of “randomized encouragement” design, in which programs are offered encouragement to participate in training rather than directly assigning providers to experimental and control conditions, was used to improve the engagement of the community in the study overall. As a result of this design approach, it was expected that there would be variation within and between the randomized intervention conditions in actual exposure of case managers to depression trainings. This also afforded an opportunity to explore the effects of actual exposure to training (participation or nonparticipation; i.e., trained/not trained) at the case manager level across implementation intervention conditions through a non-experimental observational approach.

Accordingly, this dissertation also tested the direct effect of training exposure or participation, compared to nonparticipation (not trained) by paraprofessional case managers, on case manager outcomes using a similar but more specific set of hypotheses. It is believed that direct training participation compared to nonparticipation would lead to:

6. Higher scores at posttest on measures of use of evidence-based, problem solving strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes).

7. Greater participation at posttest in delivering services in community-based settings (secondary outcome of importance from community capacity building perspective).
8. Higher scores at posttest in perceived knowledge about depression, and in positive attitudes about delivering depression services and toward clients experiencing depression (secondary outcomes).

9. Fewer perceived barriers at posttest within their local environment to providing depression services (secondary outcome of importance to systems and...}

This area of study is important because community-based organizations and healthcare settings, including those providing social services, substance abuse services, faith-based and nontraditional services, may be the only settings where low-income African Americans and Latinos receive assistance to cope with depressive symptoms and these settings may have relatively few professional providers (see, for example, Wells, 1999, 2006; Williams et al., 2007). Yet most of the research on the delivery of collaborative care interventions for depression relies on professional care managers within private sector primary care settings. Little is known about the effects on paraprofessional case managers’ competencies of participating in evidence-based training for collaborative care, and findings related to this area would help inform efforts to improve capacity and services delivery through this more commonly available workforce in under-resourced communities. Building a similar capacity in under-resourced communities can fill an important knowledge gap that also has direct services implications for under-resourced communities, given the high prevalence of depression in such communities and the existing disparities with respect to the availability and accessibility of evidence-based treatment.
Organization of Study

Chapter 2 presents a review of the relevant literature with regard to the central issues of concern to this study; i.e., the research associated with the problem of poor access to depression care services and the testing of the efficacy of community depression care interventions. The important literature that supports the conceptual frameworks that guided this study also are presented and discussed.

Chapters 3 and 4 focus on the methodology, data collection procedures, and results. A detailed description of the study sample, design, and measures are discussed in chapter 3, along with the procedures used to analyze the data. Chapter 4 presents the results pertaining to the research questions. It presents an analysis of the data and the findings relevant to both sets of hypotheses related to program-level intervention effects on the one hand, and direct provider exposure to training participation on the other. Outcomes analyzed include case managers’ reported use of depression-related management techniques, knowledge and attitudes about depression, participation in providing services in the community, and perceived barriers in their program environment to providing depression services.

Chapter 5, the last chapter, begins with a summary of the findings. It then includes a discussion of what these findings may mean in the context of social cognitive theory, the community-based participatory research framework that guided the analyses, previous research evidence, and current policy trends. It concludes with a discussion of the usefulness of this study, limitations, and some suggestions for future research.
Chapter II

LITERATURE REVIEW

Empirical Evidence

Improving outcomes for clients experiencing major depression or depressive symptoms requires more than simply prescribing a new treatment (Von Korff 2001). As called for in the Institute of Medicine report, it requires a change in the organization and functioning of health care teams, much like those being used to improve the outcomes for other chronic illnesses (Von Korff & Goldberg, 2001). The case manager in both role and function is integral to the collaborative care model and collaborative depression care. The case manager provides education, behavior change counseling (a problem solving intervention approach), active follow-up, and outreach to patients to improve treatment adherence and monitor outcomes of treatment (Katon, Von Korff, Lin, & Simon, 2001).

Findings from a longitudinal study of more than a thousand (n = 1,356) Latino and African American patients with a diagnosis of depression demonstrate that patients who received shared (or collaborative) depression care involving agency-based case management services showed greater symptom improvement over a year in comparison to their counterparts who received the usual care characterized in large part by referrals for treatment to mental health organizations outside the community (Wells, 2000). Wells and his colleagues (2004) also found that after five years, collaborative-care or shared-treatment programs that had a community agency-based case management component were significant predictors of better mental health outcomes and fewer unmet needs for appropriate care.
Another study consisting of 1800 patients with major depression, in which half (n = 906) got an intervention involving psychoeducation, treatment adherence monitoring and/or brief problem solving treatment for depression carried out by a case manager as part of a collaborative-care team and half (n = 895) got the usual care involving referrals for treatment mostly outside the community—found that those who got the intervention, in comparison to their counterparts who got the usual care, had significantly lower depression severity at 3-, 6-, and 12-month follow-ups and higher rates of treatment compliance (Jurgen Unutzer et al., 2002).

In a study of 329 patients with co-morbid diabetes and depression/dysthymia, patients were assigned randomly to a case management intervention called pathways (n = 164) or to usual care (n = 165). The intervention patients were provided with enhanced education in support of their prescribed antidepressant medication and problem solving treatment as needed. When compared to the usual-care patients, the intervention patients had greater improvement in antidepressant medication compliance, less severity of depressive symptoms, and a higher rate of patient-rated global well-being at the 6- and 12-month follow-ups (Katon et al., 2004).

In their meta-analysis of the long- and short-term effects of collaborative depression care versus the usual care, Gilbody and colleagues (2006) reported that depression outcomes among patients who got collaborative or shared care improved in as little as 6 months in some studies and that the benefits of such care were evident at follow-ups spanning 5 years in other studies. In short, collaborative care for depression involving case managers has been found to be effective in improving depression outcomes in both the short and the long term.
Ell et al. (2010) sought to determine if evidence-based, socio-culturally adapted collaborative depression care (again, involving case management) might be associated with the increased likelihood that low-income patients would respond positively to outreach efforts focused on receipt of needed services. In this randomized controlled trial, 387 diabetic low-income patients with clinically significant depression were recruited from two clinics and followed for 18 months. The intervention group received problem-solving treatment (provided by trained nonprofessional providers) and an anti-depressant medication based on a stepped-care algorithm. Evidence-based socio-culturally adapted care was defined as treatment involving telephone follow up, treatment response clarification, system navigation information, and adherence and relapse prevention screening for over 12 months. The usual care group received standard clinic care in addition to depression educational pamphlets and a community resource list. Intervention patients were found to have significantly greater depression improvement at 6-, 12-, and 18-month follow-ups, as well as better functional outcomes with respect to daily living in the community.

Finally, Gensichen et al (2009) found that case management provided by paraprofessionals in small primary care practices in Germany was associated with reduced depression symptoms and improved depression care quality for patients with major depression. Their study was informed theoretically by problem solving and social cognitive perspectives. As such, the case management component of the collaborative-care intervention team helped patients to set goals and solve problems for improved self-management (see also Wagner, 2001).
Theoretical Foundation

This study accommodates ideas from problem solving treatment as an intervention strategy in efficacious depression care and social cognitive theory.

Problem-solving treatment is a cognitively and behaviorally oriented intervention that focuses on activities by which people attempt to understand and resolve problems of daily living (Bell & D'Zurilla, 2009; Nezu, 2004). D'Zurilla and Goldfried (1971) define social problem solving as a process which makes available a variety of effective response alternatives for dealing with problematic situations; a step-by-step coping process that increases the probability of selecting an effective response from various alternatives (D'Zurilla & Golffried, 1971). Problem solving treatment, moreover, is based on a relational model of stress and well-being and is thought to play an important role as a moderator of the relationship between stressful life events and well-being (D'Zurilla & Nezu, 2007).

Applying a problem solving orientation involves viewing problems as challenges, assuming that those challenges can be solved, and believing that the solution often requires time and a systematic approach (Nezu, 2004). The problem solving technique includes: 1) helping the client to identify and define the problem; 2) helping the client establish realistic goals for problem resolution; 3) encouraging the client to generate multiple solutions (brainstorming); 4) helping the client evaluate the pros and cons of each solution in terms of cost in effort, time, resources, etc.; 5) encouraging the client to choose the best solution for him/her; 6) implementing the solution in small measurable steps; 7) evaluating the outcomes. Problem solving treatment has been shown to be an
effective intervention in depression care service delivery (Bell & D’Zurilla, 2009; Elliott & Hurst, 2008; Malouff, Thorteinsson, & Schutte, 2007)

In this study, social cognitive theory provided a framework that guided the training of case managers. As outlined by Bandura (1997), this theoretical perspective addresses the capacity to: 1) symbolize behavior; 2) anticipate outcomes of behavior; 3) learn by observing others; 4) have confidence in performing a behavior; 5) self-determine and regulate behavior; and 6) analyze the outcomes. It was anticipated that trainings guided by this framework would foster case manager self-efficacy.

Self-efficacy is the confidence a person feels about performing a particular activity (Baranowski, Perry, & Parcel, 2002). Bandura (1997) posits that self-efficacy is the most important prerequisite for behavior change because it affects how much effort is given to a particular task and what level of performance that is attained. Individuals who believe strongly in their ability to perform a behavior successfully are more likely to initiate and maintain a behavior even under difficult circumstances, while those who have less self-efficacy will avoid the task (Parle, Maguire, & Heaven, 1997).

Using Social Cognitive theory as a guiding framework, the expectation was that case managers who participated in the intensive training, in comparison to their counterparts who participated in the technical-assistance-only control condition, would show increased feelings of self-efficacy from pretest to posttest in their knowledge about client outreach, and in their ability to recognize depressive symptoms. The further expectation was that those who participated in the intensive training would show greater knowledge (than their counterparts who got technical assistance only) of problem solving treatment (when appropriate) in depression care service delivery at posttest.
In sum, social cognitive theory informed this dissertation study, because it addresses the dynamics of individual behavior and the interaction between people and their environments, thereby serving as a theoretical anchor for an intensive training program that sought to: 1) increase the perceived depression case management efficacy of the paraprofessional case managers regarding their abilities to intervene with clients who manifest depressive symptoms; and 2) improve their knowledge of depression care techniques involving problem-solving intervention skills with clients who manifest depressive symptoms. Problem solving is an effective approach to helping people manage their depression and can be used by well-trained paraprofessionals.

Finally, it should be acknowledged that the community-based participatory research (CBPR) is the framework that informed the larger study from which data for the present study came was informed by the nine principles of community-based participatory research that follow: 1.) CBPR acknowledges community as a unit of identity; 2) CBPR builds on the strengths and resources within the community; 3) CBPR facilitates a collaborative, equitable partnership in all phases of research, involving an empowering and power sharing process that attends to social inequalities; 4) CBPR fosters co-learning and capacity building among all partners; 5) CBPR integrates and achieves a balance between knowledge generation and intervention for the mutual benefit of all partners; 6) CBPR focuses on the local relevance of public health problems and on ecological perspectives that attend to multiple determinants of health; 7) CBPR involves systems development using a cyclical and iterative process 8) CBPR disseminates results to all partners and involves them in the wider dissemination of results; 9) CBPR involves a long term process and commitment to sustainability (Israel et al., 2003).
CHAPTER III

METHOD

Sample

The sample for this dissertation consisted of 117 paraprofessional case managers from 51 agencies, which housed 95 programs. The programs were matched into pairs or small clusters and stratified by service sector and community for purposes of randomization. Within each pair/cluster, programs were randomized either to Community Engagement and Planning (CEP) intensive case management training, or Resource for services (RS) (expert technical assistance plus outreach to individual programs). Although both implementation conditions were designed to promote uptake and use of the evidence-based toolkit and to improve intervention skills, the level of training intensity differed.

Among all enrolled providers in participating programs, there were 58 paraprofessional case managers enrolled from programs assigned to the CEP condition which were offered the more intensive case management training. Case managers assigned to CEP could also participate in other training modules available to advanced degree practitioners. Fifty-nine paraprofessional case managers were enrolled from programs assigned to the RS condition. These case managers were invited to attend the webinars and/or participate in site visits (if in primary care) offered through the RS technical support.

Prospective participants were notified of their agency’s involvement in the larger study by letter and through a kick-off conference for their community (Wells, 2006).
They also were recruited with packets distributed to workers at each agency as well as by telephone calls and site-visit discussions of the study at participating agencies.

**Procedures**

*Baseline and 12-month Surveys*

After verbal and written consent, case managers in both conditions were asked at baseline and 12 months subsequently to complete online surveys on the following content areas: Hours of engaging in direct depression care services, perceptions of depression knowledge and service delivery, depression stigma attitudes, perceptions of depression case management skills (self efficacy), use of problem solving techniques in the delivery of services, and the number of perceived barriers regarding their ability to deliver depression care services.

*Training Toolkits*

The trainings for both intervention conditions were based on existing, evidence-based collaborative care (experimental group) or quality improvement (control group) toolkits for depression care. They represent the best from the Partners in Care, We Care, IMPACT and Mental Health Infrastructure and Training initiatives (Wells et al., 2000; Miranda et al., 2003; Unutzer et al., 2002; Springgate et al., 2009). The toolkits were originally designed for use by licensed clinicians such as nurses and social workers, subsequently modified for use by community health workers (Wennestrom et al., 2009), and, for this study, the components of the basic toolkits included guidelines for general case management, depression screening and care coordination, together with outreach
strategies, problem solving, behavioral management, and behavioral activation skills. The toolkits were manualized and made available to participants on line via flash drives.

Community Engagement and Planning (CEP) (experimental group):

The CEP case manager training was led by this researcher, in collaboration with 2 academic and 1 community Steering Council members as leads, and (for each community) at least one community co-leader who volunteered for this role from a participating program. This investigator also led the training of the community co-leaders from each community.

The more intensive CEP depression-care training program was delivered in person either at large provider trainings or smaller case manager focused trainings at participating agencies. Paraprofessional case managers were allowed to participate in half-day or all-day training sessions that included an overall orientation to collaborative care, followed by more intensive training. The 6 hours of training could span one or several days. In addition, individual make-up sessions were offered to sites that could not come to the larger trainings. These short-course versions focused on a specific component such as general case management or problems solving skills. There were also follow-up group telephone supervision sessions offered (2-3 per community). Case managers were given thumb drives with toolkits fully loaded as well as access to on-line resources. Hardcopies of manuals and forms were also available on request.

The didactic portion of the training consisted of reviewing the purpose of the study, definitions of relevant terms, and how to use the training materials. Subsequent to the didactic training, case managers were provided with a demonstration video of how to
engage a client through depression outreach, how to screen for depression using the PHQ-9 (a depression screening tool), and how to use behavioral activation and problem solving techniques. They also were provided with the tools to score the PHQ-9 and make appropriate referrals. Participants were then asked to role-play scenarios in small groups while being observed by the training leaders. Case managers were allowed to participate in the training more than once and encouraged to participate in monthly telephone calls with the case management trainer to discuss implementation issues, concerns, and successes. Although the case management course and webinars were the primary trainings for those in both the CEP and the RS conditions, participants also had access to several other trainings offered at their agencies that covered other components of collaborative care (psychotherapy, medication management, and other). Knowledge across the intervention continuum is important, because paraprofessional case managers working within a collaborative care framework need to understand depression and related services in order to fulfill their role.

*Resources for Services (RS) (control group)*:

The RS intervention focused on a transfer of knowledge of case management skills through webinars. Webinar topics included how to engage prospective clients, form a helping relationship, recognize depressive symptoms, conduct screenings using the PHQ-9 depression screener, make appropriate referrals, and carry out a problem-solving (behavior-change) intervention. Case managers in the agencies assigned to the resource for services technical-assistance-only condition were given access to the manuals, toolkits, and webinars, but without the intensive training. For each community, four 1- to 2-hour webinars were offered to review case manager training. In addition, case
managers had access to thumb drives and an on-line website with all the case manager
toolkits and could request hardcopies of the manuals and forms. RS participants also had
access to several other training modules offered at their agencies to other provider types.
This is important to note because the present study did not control for other trainings that
those in the control group, as well as the experimental group, may have had access to and
may have chosen to participated in.

Measures

The survey instrument captured provider characteristics such as occupation,
ethnicity, age, gender, and educational attainment as well as scales measuring variables
of interest in the test of paraprofessional case managers’ knowledge and perceived self-
efficacy with regard to depression-care intervention practices. All of the variables
included in the analyses consist of scales whose values represent the mean. Items were
reversed as necessary so that a higher score indicates more of the attribute named in the
label. Alpha coefficients were obtained for scales with more than two items.

Depression knowledge, depression treatment practice questions, and depression
care management stigma (attitudes) were adapted from the provider measures used in the
Partners in Care Study (Wells, 1999, 2006). Depression treatment questions are based on
evidence-based statements from the Agency for Health Care Research Quality (AHRQ)
practice guidelines for depression and validated by an expert panel (Wells 2006). The
measures for the present study are described in the paragraphs that follow.

Depression Care Management Knowledge & Practice Efficacy (primary):
Perceived depression care management self-efficacy was assessed by case managers’
responses to the following question: “How much do you think you know about
depression?” Response options ranged from 0 = A lot to 4 = Nothing or Very Little.
Additionally, they were asked to indicate their perceived ability to carry out the following
activities on a multi-item 6-point scale ranging from 0 = Not Skilled to 5 =Very Skilled:
1) Case finding (outreach for depression and identifying individuals who may need
clinical screening/assessment or treatment for depression); 2) Screening for depression
(using a standardized assessment instrument); 3) Counseling for depression (using
problem solving, behavioral activation and education interventions); 4) Referring to
mental health specialty care; 5) Providing social support for depression (support groups);
6) Engaging in community outreach for depression (engaging in public awareness
campaigns or education campaigns).

*Depression Treatment Practice (use of problem solving techniques: primary):*

Case managers were asked to indicate how often they performed each of the following on
a six point scale—from 0 = Never to 5 = Always—when serving a person who shows
symptoms of depression: 1) Explain what depression is, 2) Ask the individual what he or
she thinks depression is, 3) Ask about prior mental health treatment, 4) Ask about barriers
to depression care, 5) Encourage positive thinking, 6) Discuss costs of alternative mental
health treatments, 7) Encourage involvement in pleasurable activities, 8) Discuss ways to
improve social skills, 9) Determine individual’s depression treatment preferences, 10)
Recommend ways to take care of one’s self, 11) Reframe or clarify the individual’s
mental problems, 12) Discuss benefits of different depression treatments, 13) Help
individual feel better about his/her life, 14) Discuss how depression may affect the
family.
Depression Treatment Practice (Use of Case Management Techniques) (secondary): Case managers were asked to indicate how often they performed each of the following on a six-point scale—from 0 = Never to 5 = Always—when serving a person who shows symptoms of depression: 1) How often do you explain what depression is, 2) How often ask the individual what he or she thinks depression is, 3) How often make a referral for depression care services, 4) How often ask about barriers to depression care.

Depression Treatment Practice (time engaged in depression care: secondary): Case managers were asked to indicate on a six-point scale how many hours in a typical week they spend on the following activity:

<table>
<thead>
<tr>
<th>Providing services directly to individuals in a community setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: 0 hours</td>
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</table>

Depression Care Management Stigma (Attitudes: secondary): Case managers were asked to indicate their attitudes about service delivery to people with depression by their responses to the following statements on a 4 point scale from 1=Strongly Agree to 5=Strongly Disagree: 1) I have no patience with a person who is always feeling 'blue' or depressed, 2) I would be embarrassed if people thought I was depressed, and 3) Most people think less of a person who has been depressed.

Depression Case Management Perceived Barriers: Case Managers were asked to indicate on a three-point scale from 1 = None to 3 = A Great Deal the extent to which optimal depression care services were limited in the past 6 months with respect to the following: 1) Service limited by people's reluctance to accept the problem with
depression, 2) Service limited because other problems of the individual were higher priority, 3) Service limited because depression treatment was difficult to obtain, 4) Service limited because MH professionals were not available, 5) Service limited by limited visit time for screening/education/referral for depression, 6) Service limited by too little time for follow-up with the individual, 7) Service limited by poor reimbursement for services, or limited insurance, or other benefits.

Provider Characteristics: Respondents’ age was measured in years; gender was a single dummy variable, coded 1 if female and 0 if male. Respondents’ educational attainment was indicated by answers to the following question: “What is your educational background? (Select Highest Level).” Response options ranged from 0 = less than high school to 3 = completed graduate school. Case managers were also asked to self-identify their race.

Sector: The sector (formal or informal) was indicated by whether case managers reported working for a human service organization (formal) where people normally go to receive care (such as, for example, a primary care clinic or substance abuse agency) or an outpost (such as a gym or beauty shop) where care is provided more informally.

Study Design: Group-level randomization for intent to treat study aims

Community Partners in Care (CPIC), is an NIMH RO1 grant, and was the source of data for this project and the parent in which this dissertation was nested. CPIC had a community based participatory research orientation with a focus on fostering relationships between community and academic partners. Community based participatory research has emerged as an alternative research paradigm which integrates education and
social action to improve health and reduce health disparities (Wallerstein & Duran, 2006). The emphasis is on co-learning, mutual benefit, and the inclusion of community theories and practice into research. As indicated earlier, this approach has nine guiding principles that strike a balance between research and action for the benefit of all partners. In doing so, it emphasizes local relevance of public health problems and ecological perspectives, involves system development through a cyclical iterative process, disseminates knowledge gained to all partners, involves each partner in the dissemination of knowledge, and involves a long term process and commitment (Israel et al., 2003).

This study has two major sets of aims, and each set uses the CPIC data under a different research design paradigm. For the aim of comparing the effects of the community engagement and planning (CEP) and technical-assistance-only (RS) implementation interventions on case manager outcomes, the study uses the main CPIC group-level randomized trial, comparative effectiveness design, for intent-to-train analyses. For estimating the effect of actual participation in training versus no participation across implementation conditions, the study uses an observational design. Below, I comment first on the group-level randomized design for implementation intervention aims; and then on the observational design for direct training exposure aims.

Effectiveness trials are defined as a test of whether a “program does more good than harm when delivered under real-world conditions” (Flay, 1986). The primary goal of an effectiveness trial is to determine whether an intervention works for a broadly defined population (Glasgow, Lichetenstein, & Marcus, 2003). Using a community based participatory framework, group randomized trials have the advantage of reducing concerns of individuals in vulnerable populations about being studied and being asked to
participate in randomized trials, or of receiving pre-prescribed services that may not fit their needs or personal preferences (Horowitz, Robinson, & Seifer, 2009; Murray, Varnell, & Blitstein, 2004). In addition, because individual-level randomization typically alters many features of usual care practice, such as personal choice, measurement of effectiveness of interventions is difficult to achieve within designs typical of efficacy studies (Sturm, 2006; Wells, Tang, Carlson, & Asarnow, 2011). The present design is considered quasi-experimental for analyses at the provider level, because agencies were randomly assigned to one of two implementation intervention conditions, and there could be differences at the case manager level in important individual characteristics, since randomization was not at the individual provider level. The related concerns about internal validity (non-comparable comparison groups at the individual provider level due to agency-level randomization) are typically met through control for covariates at the provider level (Murray et al., 2000). The focus of covariate control is typically on characteristics that differ across groups after randomization or that are theoretically important constructs, such as the baseline value of the outcomes variable.

In addition, as in any randomized trial, participants (programs, providers) were participating at their own convenience/agreement and there are potential threats to external validity, or generalizability. However, because of the greater acceptance in vulnerable communities of group-level randomized trials, such designs generally raise fewer concerns about external validity than do traditional, individual randomized trials. Group-level randomized trials also have less statistical power than a comparable size individual randomized design, because the degrees of freedom reflect the number of randomized units. Design efficiency is improved by having a large number of
randomized units (programs), and less clustering of participants (providers), within units. This study had 95 randomized units, a large number for a group-randomized trial.

**Study design: Observational design for direct training participation aims**

For purposes of examining the direct effects of training on case manager practice outcomes, the study has a non-experimental or observational design. This is because training occurred in both intervention arms but was done differently across arms and was designed to be more engaging or encouraging of participation in the CEP arm. Because training itself was not randomized (but rather the approach to engagement in training), this design potentially has greater acceptability, enrollment, and hence external validity. Generally, observational studies more closely mirror real practice relative to randomized trials, because they observe what people do in a usual-world context.

However, for purposes of drawing inferences about training participation effects on case manager outcomes, the design has important limitations, especially selection bias which may be to both measured and unmeasured variables (Sturm, 2006; Wells et al., 2011). These circumstances can result in biases that can easily overwhelm true effects or, with small changes, yield contradictory results (Sturm 2006).

The usual approach to addressing potential selection is to control for covariates (e.g., ANOVA to ANCOVA), but this strategy only handles confounding or selection due to measured variables. For handling potential unmeasured selection bias, one standard approach from econometrics is the method of instrumental variable analysis.

Instrumental variable analysis relies on identifying an external factor that affects the probability of training participation (e.g., “treatment”) but does not directly affect the
study outcome, case manager practice (Sturm, 2006; Wells et al., 2011). That is, the selected instrumental variables are related to the outcomes (case manager practice) only through their effect on training participation and have no independent direct effects on those outcomes (Sturm 2006). Because the form of encouragement to participate in training was randomized at the program level, and because the main goal of the randomized intervention was to build capacity of programs for depression services through provider trainings, the design of the CPIC study is ideally suited to instrumental variable analysis. That is, it is reasonable to assume that the randomized intervention (community engagement or technical assistance) meets the rigorous assumptions for an instrumental variable, within an IV analysis of the effects of training participation (“treatment”) on case manager outcomes (depression services and practices). The assumptions underlying this method and the particulars of how the design was implemented in this study are described in the “as-trained” analysis section below.

**Analyses Plan**

The analysis has three main sections: First, I describe general analysis issues that apply across specific analysis plans. Second, I describe the analysis plan for the intent-to-train analyses using the experimental group-randomized design to examine effects of the randomized program-level interventions on case manager outcomes. Third, I describe the observational analysis of the effects of actual training participation on case manager outcomes, using the method of instrumental variable analysis. I close this chapter with a brief summary of the main research questions and key features of the analysis approach.
General Analysis Issues

The primary general analysis issues that need discussion here are weighting and the handling missing data through multiple imputation. The weights and imputations used for this dissertation were those used for the overall CPIC study and were created by CPIC staff. The weighting and multiple imputations were done to improve the generalizability to the eligible sample on all measures. Inference statistics also account for any uncertainty involved in using a multiple imputation method.

Multiple Imputations: An extended hot deck multiple imputation technique was used to impute missing values (Little, 1988). The procedure was based on cycling through each missing-data pattern on each variable with incomplete items. This method involved two steps: (1) forming imputation classes based on the predicted mean of the variable being imputed from a multiple regression model, and (2) drawing imputations at random from observed data within each class based on an approximate Bayesian bootstrap. Five imputed datasets were created. Each of the imputed data sets differs by the seed used to obtain the random number employed in the hot deck imputation. With imputations stratified by intervention arms, 5 alternative imputed datasets were produced for baseline and follow-ups, and multiple imputation inference was used in all analysis (Rubin, 1976; Schafer, 1997). The approach for selecting variables for multiple regression models was intended to preserve the associations and relationships among variables. Common predictors were identified for all imputation models including design variables (community, type of programs), and social demographic variables: gender, race, education, and provider type (licensed vs. non licensed). In addition to these common predictors, each imputation model also included other predictors to be used in later
analyses of interest. The order in which variables were imputed was determined based on the questionnaire. Earlier imputed values were used during subsequent imputation steps, implying some dependence on the order in which variables were imputed. In applications, we imputed baseline missing data regardless level of missingness (item-level, or unit-level nonresponse). In dealing with 12 month missing data, we used the combination of multiple imputations for imputed item-level missingness and weighting adjustment for unit-level nonresponse

Weighting: To control for potential nonresponse bias, nonresponse weights were created on 12 month respondents (total 237, RS: 112, CEP: 125) for attrition to present eligible sample (eligible for 12 month: total: 297, RS: 137, CEP: 160). We started with a large set of demographics (age, gender, race, education, type of provider), design variables (community, service sector), and provider baseline variables (hours of direct services, depression knowledge in general, perception of depression knowledge, attitude, skill, and service time for depression) to be considered for a logistic regression on the outcome of response (coded 1 if completed either baseline or 12-month follow-up and 0 otherwise. The final model included all predictors that were significant (p<0.10) for either the intervention group or the control group: service sector (formal vs. informal), education baseline perception of depression attitude and skill. The reciprocal of the predicted response probability was used as the enrollment weight for each participant. Five versions of the weight were created corresponding to five imputed data, because imputed predictors from the baseline were used in fitting logistic regressions (Dillman & Eltinge, 2002; E. L. Korn & graubard, 2011).
Multiple Comparisons are addressed by comparing the proportion of results favoring one intervention to an assumed null-hypothesis value of 0.5. The Bonferroni was considered but will not be relied upon solely. The False Discovery Rate (FDR) is a related method of adjustment that incorporates bounds on the probability of a single false finding of significance. The False Discovery Rate (FDR) will also be considered as an alternative to the more stringent Bonferroni method (Benjamini & Hochberg, 1995). The False Discovery Rate is a framework that offers more sensitive tests of significance when large numbers of tests are carried out by comparing observed significance findings with expected order statistics from a uniform distribution (Benjamini & Hochberg, 1995).

**Intent to Train Analysis (Experimental):** I examined the demographic and baseline clinical characteristics of the study sample to assess the balance across experimental groups at baseline using Chi-square test. We conducted intent-to-treat, comparative effectiveness analyses with intervention status as the independent variable, using a logistic regression model for the dichotomous measure (i.e. participation in evidenced based depression care training) and multiple linear regression models for continuously scaled variables (e.g. Use of problem solving techniques), adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed). To account for clustering (clients nested within programs), the variance estimation was based on the Taylor Series Linearization Method (Binder, 1983). All analyses were conducted using SUDAAN Version 11.0.0 (Software for the Statistical Analysis of Correlated Data at [http://www.rti.org/sudaan/](http://www.rti.org/sudaan/)) with the design specification of sampling with-replacement in the first stage of sample selection (programs), and
accounted for attrition weights. We illustrate average results for an intervention arm adjusted for all covariates using standardized predictions generated from the fitted regression model (E. Korn & Graubard, 1999). The analysis was performed on each imputed data set and results across the five imputed data sets were combined by averaging, standard errors were adjusted to reflect both within-imputation variability and between-imputation variability, and significance of comparisons by intervention status was based on regression coefficients and t-test were be used for testing intervention effects.

Earlier, I hypothesized that paraprofessional case managers who were exposed to the community engagement intervention, compared to the resource for services technical assistance intervention, would demonstrate:

1. Greater participation in evidence-based depression care training (primary outcome). Linear Regression was employed using scales measuring perceived depression care management; depression knowledge and self-efficacy; toolkit use and problem solving techniques (primary outcome) were used. Adjusted analyses used multiply imputed data, weighted for eligible sample for enrollment. The models were adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

2. Higher scores at posttest on self-reported measures of use of evidence-based, Problem-solving (therapeutic) strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes). I expected effects to be strongest for the more novel therapeutic strategies than for more
traditional case management activities. Linear Regression was used with scales measuring case managers attitudes and perceived skills. The adjusted, multiply imputed data, was weighted for eligible sample for enrollment. The models adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

3. Greater participation at posttest in delivering services in community-based settings (secondary outcome of importance from community capacity building perspective). Linear Regression was used with scales measuring case managers attitudes and perceived skills. The adjusted, multiply imputed data, was weighted for eligible sample for enrollment. The models adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

4. Higher scores at posttest in perceived knowledge and self-efficacy about depression, and reduced stigma about depression and delivering depression services and toward clients experiencing depression (secondary outcomes). Linear Regression was used with scales measuring case managers attitudes and perceived skills. The adjusted, multiply imputed data, was weighted for eligible sample for enrollment. The models adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

5. Reporting fewer barriers at posttest within their local environment to providing depression services (secondary outcome of importance to systems and reflecting
the program engagement features of the intervention). Linear Regression was used with scales measuring case managers attitudes and perceived skills. The adjusted, multiply imputed data, was weighted for eligible sample for enrollment. The models adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

*Detailed Intent-to-Train Analysis Plan*

The analysis sought to ascertain the overall relative effects of two implementation intervention conditions (CEP vs RS) on case managers’ actual participation in training, depression practice, time spent delivering community services, depression care knowledge and attitudes, and perceived barriers to providing depression care (hypotheses 1-5 above).

*Baseline Balance:*

Using SUDAAN, a Software for the Statistical Analysis of Correlated Data, Chi square was used to assess whether there were any significant differences between the CEP and RS care managers at baseline on the following variables: community, type of program employment, and social demographic variables: gender, race, education, and provider type. The design effects of the cluster randomization were accounted for, and what was found was that the groups were well balanced on these characteristics.
Main Estimation:

Linear Regression models for continuous variables for each stated hypothesis except for the probability of training which logistic regression models were used. The primary predictor for these models was the CEP vs. RS intervention status for the program in which case managers practiced. Because group-level randomization can lead to an imbalance at the provider level within the group (that is, providers within programs), it is standard in analyzing the effect of a group level intervention on units within the group (that is, on providers within programs), to control for relevant covariates at the level of the analytic unit (program or provider) that could either affect the outcome of interest or that reflect known differences in balance after randomization (Murray, Varnell, & Blitstein, 2004).

Covariates, such as case manager demographics characteristics adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

As-Trained Analysis (instrumental variable analysis, observational)

Additionally, I hypothesized that exposure to case manager training, compared to not being exposed, would have the following effects: greater self-efficacy and knowledge with regard to depression-related skills and competencies as noted above. In keeping with the hypotheses, the following question was asked:

What is the effect of actual exposure to case manager training for evidence-based depression services across the implementation intervention conditions on the use of problem solving techniques by nonprofessional case managers and, secondarily, on
their knowledge and attitudes about depression services and people with depressive symptoms?

The hypotheses related to the effects of direct training participation compared to nonparticipation, suggest that training participation would lead to positive results on hypothesis 6-9 as stated in chapter one.

In order to address this question and set of hypotheses, the approach of instrumental variable analysis was used as discussed below.

Instrumental Variable Analysis Plan

Determining the effect of actual exposure to case manager training for depression services across the implementation conditions on the study’s outcomes is observational in nature, and thus subject to potential selection bias. If selection were limited to measured variables, simple covariate control might be sufficient to account for selection bias. However, selection bias can be in unobserved characteristics. One leading approach to account for selection bias from unobserved variables is instrumental variable analysis (Sturm, 2006). While there are alternative approaches to account for potential selection bias which can occur for both measured and unmeasured variables, it is the instrumental variable approach that is the leading way to account for unobserved characteristics.

As indicated above, instrumental variable analysis relies on the identification of an instrument that predicts the probability of treatment, but has no independent effect on outcomes (Wells, in press). This technique supports causal inferences when selection bias
is present. The overall randomized intervention was used as the instrument (Wells et al., in press; Angrist et al. 1996). There are five assumptions underlying the plausibility of the instrument as valid for purposes of applying this method: 1) random assignment or random distribution; 2) the instrument affects treatment (training participation) rate (non-zero average causal effects, 3) the outcomes are unlikely to be affected by the instrument (intervention condition) except by treatment (training participation, called the exclusion restriction), 4) outcomes for case managers are unlikely to be affected by outcomes for other case managers (stable unit treatment value), and 5) case managers with positive outcomes of training in one intervention would likely have positive outcomes of training under the other intervention; i.e., monotonicity (Wells et al., in press; Schoenbaum et al 2002). In the case of this study, it is plausible that all necessary assumptions are met, because: the intervention condition is randomized at the group level and thus likely to be distributed at random; it is designed specifically to affect training participation; it is unlikely to affect case manager outcomes through other mechanisms than training participation; outcomes for case managers in these domains are unlikely to change except through training either directly at study events or in events hosted in agencies that are also measured as part of the training effect; and training events would likely have similar effects under both interventions if case managers are exposed because they are based on the same evidence-based toolkits.

In the instrumental variable approach, two equations are estimated: 1) the effect of the instrument (assumed to be random) on “treatment” (training indicator); and 2) the effect of the expected treatment (predicted training indicator from first equation) on the outcome of interest. By using expected treatment (training indicator) as a function on an
exogenous variable that affects it but is random with respect to outcome other than through treatment, the method allows the effect of the treatment of interest (training) to be observed, purged of the potential selection bias, because the “lens” through which it is observed, is random with respect to the error distributions. However, it is a less precise way of viewing the effect, owing to the prediction. An analogy to this approach is the concept of viewing a true image of an object through a clouded window or from a great distance—we can see it but with less precision. There are several different ways to estimate the 2 equations, including sequentially, or preferably, simultaneously. The key steps are to identify an instrument; a treatment indicator; and an outcome that meet the rigorous assumptions listed above and represent a meaningful effect of interest, and to develop an appropriate specification of the technical model.

*Instrumental Variable:*

The combined variable of paraprofessional case managers who either registered at training or reported training on their follow-up surveys (which would cover non-sponsored training events at their agency) was the identified instrument for the instrumental variable analysis.

*Instrumental Variable analysis:*

The instrumental analysis was conducted using STATA (treatreg) procedure and specifying the program-level randomization as the instrument and an indicator of any training participation from training logs and provider surveys as the training variable, with simultaneous estimation of the probability of the instrument on training and of training on case management outcomes, adjusted for baseline status of the dependent
variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed) and accounting for the cluster effect of providers nested in programs; data were multiply imputed and weighted for eligible sample for enrollment. Specifically, the instrument variable analysis was conducted by simultaneous estimation using bivariate probit regression to jointly model the effect of the program –level intervention condition on the probability of training participation and the effect of training participation on paraprofessional case manager outcomes pertaining to the depression self-efficacy, and competencies.

There is a consequence to performing multiple comparison tests without methodological control. As the number of hypotheses tested increases so does the probability of wrongly accepting a null hypothesis due to random chance (Pike, 2011). As indicated earlier, the most widely used and conservative method for addressing the multiple comparisons issue is the Bonferroni (Aickin & Gensler, 1996; Benjamini & Hochberg, 1995; Pike, 2011). However, Bonferroni can be overly stringent and misleading (H. Jones, Ohlssen, & Spiegelhalter, 2007). Recall that the False Discovery Rate (FDR) is an alternative approach to managing multiple comparisons and it is less conservative than the Bonferroni (Benjamini & Hochberg, 1995; H. Jones et al., 2007). The False Discovery Rate (FDR) also accounts for multiple comparisons, but has a more balanced approach. This approach is less likely to misclassify a significant hypothesis as false, while limiting falsely significant outcomes (H. Jones et al., 2007; Pike, 2011). In this dissertation, p values using the Bonferroni method and p values using in the FDR are presented for hypothesis related to primary outcomes.
CHAPTER IV
RESULTS

This dissertation sought to evaluate the effectiveness of a community engagement intervention compared to a technical assistance intervention on the delivery of collaborative depression care by paraprofessional case managers in underserved communities in Los Angeles, as well as to evaluate the effect of direct exposure to evidence-based depression skills trainings for these case managers compared to no training on a range of case manager outcomes.

The specific questions for this study are:

1. Can paraprofessional case managers be trained to deliver evidence-based depression support services similar to those described for professional case managers in the literature?

2. What are the effects of an intensive community engagement and planning implementation condition versus a time-limited technical-assistance-only implementation condition on paraprofessional case managers’ willingness to engage in evidence-based intervention strategies in the delivery of depression services in community settings?

3. What are the effects of actual exposure to evidence-based case manager training across the implementation intervention conditions on paraprofessional case managers’ use of problem-solving techniques for depression practice interventions, on the enhancement of their knowledge about depression, and on their attitudes toward the delivery of services to people with depressive symptoms?
Question 1 concerns the feasibility of training nonprofessional case managers and it is essentially answered through the analyses for questions 2 and 3, and the interpretation of all analyses in terms of question 1 is discussed in Chapter 5.

For question 2, the comparative effects of community engagement or technical assistance interventions on case manager outcomes, 5 hypotheses were proposed, i.e., that community engagement intervention relative to the technical assistance intervention would lead to:

1. Greater participation by paraprofessional case managers in evidenced based depression care training (primary outcome).

2. Higher scores at posttest on self-reported measures of use of evidence-based, problem-solving (therapeutic) strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes).

3. Greater participation at posttest in delivering services in community-based settings (primary outcome of importance from community capacity building perspective).

4. Higher scores at posttest in perceived knowledge about depression, and in positive attitudes about delivering depression services and toward clients experiencing depression (secondary outcomes).

5. Reporting fewer barriers at posttest within their local environment to providing depression services (secondary outcome of importance to systems and reflecting the program engagement features of the intervention).
For question 3, the direct effect of participation in depression skills training for case managers compared to nonparticipation, the following 4 additional hypotheses were proposed, that training participation would lead to:

6. Higher scores at posttest on self-reported measures of use of evidence-based, problem solving (therapeutic) strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes).

7. Greater participation at posttest in delivering services in community-based settings (primary outcome of importance from community capacity building perspective).

8. Higher scores at posttest in perceived knowledge about depression, and in positive attitudes about delivering depression services and toward clients experiencing depression (secondary outcomes).

9. Reporting fewer barriers at posttest within their local environment to providing depression services (secondary outcome of importance to systems and reflecting the program engagement features of the intervention).

The presentation of results is organized as follows: First, demographic, descriptive characteristics of the sample of nonprofessional case managers are presented. Then results are presented for testing the 5 hypotheses pertaining to question 2 (referred to as “intent to train” or effect of the community engagement versus technical assistance intervention approach), and then results are presented for testing the 4 hypotheses related to question 3 (referred to as “as trained” or direct effect of training participation versus nonparticipation).

For all main hypothesis testing, results are presented grouped according to primary or secondary outcomes to facilitate interpretation of the findings.
Demographic and Descriptive Characteristics

Table 1 displays the demographic and descriptive characteristics of the sample of case managers in Resource for Services (RS control group) and the Community Engagement (CEP intervention group). The overall analytic N for the study was 117 case managers. The intervention randomization occurred at the program level with n=59 being randomized to RS and 58 being randomized to CEP. What is shown is that there were no significant differences between the two intervention groups on any of the demographic variables measured. Fifty-five (47%) identified themselves as Hispanic; 52 (45%) were African American; 7 (6%) were non-Hispanic white; and 3 (2%) self identified as Asian Pacific Islander. One hundred and five case managers reported that they had some college education. The mean age of the sample was 43.6 years old and 82 or 70.2% of the sample were woman. With the exception of perception of depression attitudes, there were no differences in baseline outcome variables between the two groups. Both groups were equally matched on almost all characteristics, indicating that the randomization strategy was effective overall, although it is likely that one might be significant at the .05 level by chance alone (see, for example, personal depression stigma in Table 1).
Table 1. Baseline Characteristics of Participants in Outcomes Analysis by, Intervention Group Status*

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<thead>
<tr>
<th></th>
<th>Overall (N=117)</th>
<th>RS (N=59)</th>
<th>CEP (N=58)</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPA-6 (vs. SPA-4), No. (%)</strong></td>
<td>83 (70.7)</td>
<td>42 (69.8)</td>
<td>41 (71.5)</td>
<td>0.0</td>
<td>1</td>
<td>.905</td>
</tr>
<tr>
<td><strong>Formal sector (vs. informal), No. (%)</strong></td>
<td>69 (62.8)</td>
<td>40 (71.0)</td>
<td>29 (54.6)</td>
<td>0.9</td>
<td>1</td>
<td>.342</td>
</tr>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-licensed, No. (%)</td>
<td>87 (72.7)</td>
<td>45 (75.1)</td>
<td>42 (70.3)</td>
<td>0.1</td>
<td>1</td>
<td>.725</td>
</tr>
<tr>
<td><strong>Age, mean (SD), y</strong></td>
<td>43.6 ± 12.4</td>
<td>43.6 ± 12.5</td>
<td>43.7 ± 12.3</td>
<td>0.0</td>
<td>1</td>
<td>.987</td>
</tr>
<tr>
<td><strong>Female sex, No. (%)</strong></td>
<td>82 (70.2)</td>
<td>38 (65.0)</td>
<td>44 (75.4)</td>
<td>1.0</td>
<td>1</td>
<td>.328</td>
</tr>
<tr>
<td><strong>Race, No. (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>55 (47.0)</td>
<td>26 (44.6)</td>
<td>29 (49.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>52 (44.8)</td>
<td>27 (45.3)</td>
<td>25 (44.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>7 (5.8)</td>
<td>4 (6.8)</td>
<td>3 (4.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (API/Native/other)</td>
<td>3 (2.4)</td>
<td>2 (3.2)</td>
<td>1 (1.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Some college or above, No. (%)</strong></td>
<td>105 (89.7)</td>
<td>53 (89.9)</td>
<td>52 (89.6)</td>
<td>0.0</td>
<td>1</td>
<td>.959</td>
</tr>
<tr>
<td><strong>Baseline outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Hours of direct Depression services, (by category).</td>
<td>1.4 ± 1.4</td>
<td>1.1 ± 1.2</td>
<td>1.6 ± 1.5</td>
<td>3.0</td>
<td>1</td>
<td>.085</td>
</tr>
<tr>
<td><strong>How much you know about depression, mean</strong></td>
<td>2.8 ± 0.7</td>
<td>2.8 ± 0.8</td>
<td>2.8 ± 0.6</td>
<td>0.0</td>
<td>1</td>
<td>.984</td>
</tr>
<tr>
<td>***Perception of depression knowledge mean of 3 items</td>
<td>2.0 ± 0.6</td>
<td>2.0 ± 0.6</td>
<td>2.1 ± 0.7</td>
<td>0.1</td>
<td>1</td>
<td>.699</td>
</tr>
<tr>
<td>!Personal Depression Stigma, mean of 3 items</td>
<td>3.8 ± 0.7</td>
<td>3.7 ± 0.7</td>
<td>4.0 ± 0.7</td>
<td>4.1</td>
<td>1</td>
<td>.042</td>
</tr>
<tr>
<td>!!Perception of depression skill (+), mean of 7 items</td>
<td>2.2 ± 0.7</td>
<td>2.3 ± 0.7</td>
<td>2.2 ± 0.6</td>
<td>0.5</td>
<td>1</td>
<td>.475</td>
</tr>
<tr>
<td>!!!Use of problem solving techniques (+), mean of 8 items</td>
<td>2.6 ± 1.0</td>
<td>2.6 ± 0.9</td>
<td>2.7 ± 1.1</td>
<td>0.2</td>
<td>1</td>
<td>.628</td>
</tr>
<tr>
<td>#$Use of depression Case Management techniques (+) (sub n=101), mean 8</td>
<td>2.6 ± 1.1</td>
<td>2.7 ± 1.1</td>
<td>2.5 ± 1.0</td>
<td>0.6</td>
<td>1</td>
<td>.433</td>
</tr>
<tr>
<td>## number of system barriers (-), mean</td>
<td>0.8 ± 1.1</td>
<td>0.9 ± 1.2</td>
<td>0.7 ± 1.1</td>
<td>0.3</td>
<td>1</td>
<td>.601</td>
</tr>
</tbody>
</table>
Table 1. Baseline Characteristics of Participants in Outcomes Analysis by, Intervention Group Status*

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=117)</th>
<th>RS (N=59)</th>
<th>CEP (N=58)</th>
<th>c^2†</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
</table>

†Data were multiply imputed and weighted for attrition to present eligible sample; Chi-square test was used for a comparison between the two groups accounting for the design effect of the cluster randomization.

*Providing depression services directly to individuals in a community setting:
0: 0 hours   1: 1-10 hours   2: 11-20 hours   3: 21-30 hours   4: 31-40 hours   5: 40+ hours

**Depression Knowledge 0: Nothing 1: Almost 2: A little 3: A moderate amount 4: A lot

***Perception of depression Knowledge 1: Strongly Agree 2: Agree 3: Neither Agree/Disagree 4: Disagree 5: Strongly Agree

! Personal Depression Stigma 1: Strongly Agree 2: Agree 3: Neither Agree/Disagree 4: Disagree 5: Strongly Agree

!!Perception of Depression Skill 1: Not skilled 2: Slightly Skilled 3: Skilled 4: Very Skilled

!!! Use of Problem Solving Techniques 1: Never 2: Sometimes 3: Often 4: Very often 5: Always

# Use of Case Management Techniques, 1: Never 2: Sometimes 3: Often 4: Very often 5: Always

Multivariate Results and Hypothesis Testing

For the first hypothesis of intervention effects on participation in case manager training related to depression skills (primary outcome), case managers randomized into the CEP intervention were significantly more likely than those assigned to RS to have received any CPIC case manager training. The results in Table 2 show that 27% of those in the control group (RS) in comparison to 74% of those in the experimental group (CEP) participated in trainings. The odds ratio of 2.05 implies that those in the intense training intervention group (CEP) were more likely than those in the technical-assistance-only resources for services (RS) group to participate in the trainings, t (50) = 4.2, p < .001. Recall that case managers in both conditions could volunteer to attend as many trainings in their agency as they wished to attend. This finding seems to indicate that those in the
CEP condition might have taken advantage of more trainings than their counterparts in the RS condition.

**Question 2 (‘Intent to Train,’ Experimental Analysis)**

Table 2 depicts also the results for the remaining hypotheses regarding intent-to-train aims (Research Question 2), concerning expected higher scores for CEP compared to RS case managers at posttest on self-reported measures of use of evidence-based problem solving (therapeutic) strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes). As shown in Table 2, paraprofessional case managers in CEP reported significantly higher use of evidence-based problem solving (therapeutic) techniques than paraprofessionals in the RS group, 3.1% versus 2.8%. The odds ratio of .32 (.03, .61) is significant, t (57) = 2.2, p < .05. Differences in depression-oriented outreach and case management activities were nonsignificant. However, as shown in Table 2 and as expected, case managers in CEP reported spending more hours providing direct depression care services to patients in community settings than did case managers in RS, odds ratio of .51, t (62) = 2.7, p < .05.

Table 2 depicts the same intent-to-train aims with both the Bonferroni and the False Discovery Rate (FDR) applied to the results. What was found is that when applying the Bonferroni method, only the receipt of any CPIC training, t (50) = 4.2, p < .001, and hours of direct service, t (62) = 2.7, p = .036, remained significant. The use of problem solving techniques and use of depression care management tasks were nonsignificant. However, when the FDR approach was applied, use of problem solving techniques, t (57) = 2.2, p = .042, and hours of direct service, t (62) = 2.7, p = .018, were both significant. It can be argued that given that all of the primary outcome findings are in the same
direction, the False Discovery Rate is the more appropriate method for handling multiple comparisons in this study.

Related to the secondary outcomes, it was further hypothesized that CEP case managers would score higher at posttest in perceived knowledge about depression and have less stigma about delivering depression services toward clients experiencing depression (secondary outcomes). However, these results were nonsignificant.

It also was hypothesized that due to greater engagement of the case managers’ programs in the CEP intervention compared to RS, CEP case managers would report fewer barriers at posttest within their local environment to providing depression services, relative to RS. Table 2a shows that the results were not statistically significant at the .05 level. The meaning of these results is unclear.

| Table 2. Predicted Primary Outcomes at Follow-up by Intervention Group Status |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                 | Adjusted Estimates | Test |
|                                 | RS % or mean (95%CI) | CEP % or mean (95%CI) | Odds Ratio or group-difference (95%CI) | t | df | p | P_{Bon} † | P_{FDR} ‡ |
| Received any CPIC training, %   | 27.0 (13.9, 40.1) | 73.9 (59.7, 88.2) | 2.05 (1.06, 3.04) | 4.2 | 50 | <.001 | <.001 | <.001 |
| Use of problem solving techniques (+), mean | 2.8 (2.5, 3.0) | 3.1 (2.9, 3.3) | 0.32 (0.03, 0.61) | 2.2 | 57 | .031 | .125 | .042 |
| Use of depression case management task (+), mean | 2.8 (2.5, 3.1) | 2.9 (2.6, 3.1) | 0.05 (-0.30, 0.41) | 0.3 | 43 | .767 | .999 | .767 |
| Hours of direct services (+), by category | 0.7 (0.4, 0.9) | 1.2 (0.9, 1.5) | 0.51 (0.13, 0.89) | 2.7 | 62 | .009 | .036 | .018 |

† adjusted p value from the Bonferroni procedure
‡ adjusted p value from the False Discovery Rate procedure
Table 2a. Predicted Secondary Outcomes at Follow-up by Intervention Group Status*

<table>
<thead>
<tr>
<th></th>
<th>RS Mean 95%CI</th>
<th>CEP Mean 95%CI</th>
<th>Group-difference 95% CI</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much you know about depression (+)</td>
<td>2.8 (2.6, 2.9)</td>
<td>2.9 (2.8, 3.1)</td>
<td>0.16 (-0.03, 0.34)</td>
<td>1.7</td>
<td>67</td>
<td>.098</td>
</tr>
<tr>
<td>Perception of depression knowledge (-)</td>
<td>2.0 (1.8, 2.2)</td>
<td>2.1 (1.8, 2.4)</td>
<td>0.09 (-0.25, 0.42)</td>
<td>0.5</td>
<td>65</td>
<td>.605</td>
</tr>
<tr>
<td>Personal depression Stigma(+)</td>
<td>3.8 (3.7, 3.9)</td>
<td>3.9 (3.8, 4.0)</td>
<td>0.08 (-0.10, 0.25)</td>
<td>0.9</td>
<td>35</td>
<td>.366</td>
</tr>
<tr>
<td>Perception of depression skill (+)</td>
<td>2.3 (2.2, 2.5)</td>
<td>2.4 (2.2, 2.6)</td>
<td>0.07 (-0.15, 0.30)</td>
<td>0.7</td>
<td>29</td>
<td>.505</td>
</tr>
<tr>
<td># of system barriers (-)</td>
<td>0.7 (0.4, 1.0)</td>
<td>0.3 (0.1, 0.6)</td>
<td>-0.33 (-0.70, 0.05)</td>
<td>-1.8</td>
<td>41</td>
<td>.085</td>
</tr>
</tbody>
</table>

*Adjusted analyses used multiply imputed data, weighted for attrition to present eligible sample; analysis of covariance (ANCOVA) adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed); and accounted for the design effect of the cluster randomization.

**Question 3 (“As Trained,” Instrumental Variable Analysis)**

This section of the results focuses on the direct effects of training exposure for participating case managers, rather than the overall effect of the randomized program-level intervention to stimulate use of collaborative care for depression as a whole. This is an observational analysis in which those who participated in training or not are combined across the two randomized intervention conditions, as training was offered in each condition. For this analysis, the approach of instrumental variable analysis was used to account for the effects of selection of case managers into training participation, on both measured and unobserved characteristics. The analysis approach used simultaneously estimates the effect of the “instrument” which in this case is the randomized intervention on participation, and the effect of participation on case manager outcomes; however what
is of interest for this dissertation are the estimates of the effects of training participation on outcomes. The first step in such an analysis is to describe the baseline characteristics of the sample as a function of participation status for training.

Table 3 presents participant baseline characteristics, including intervention assignment of their program, for paraprofessional case managers who did and did not participate in depression services training ever over a 12 month follow up. Participants and nonparticipants were comparable on demographic and practice characteristics, with the exception that participants in training had already been significantly more knowledgeable at baseline i.e., for nonparticipants knowledge score of 2.7 ± 0.7, for participants 3.0 ± 0.6 \( e^2 5.2 \) df 1 p <.05. While this one variable could be “significant” due to chance with so many characteristics compared, it also reinforces the importance of comparing training participants and nonparticipants while also attending to potential selection basis, as more knowledgeable participants might be expected to improve more in their practice patterns over time independent of a training effect. There were no other significant differences between training participants and nonparticipants (combined across intervention conditions).

<table>
<thead>
<tr>
<th>Table 3. Participant Characteristics by Training Participation Status over 12 Months Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Randomization-CEP arm (Instrument), No. (%)</td>
</tr>
<tr>
<td>SPA-6 (vs SPA-4), No. (%)</td>
</tr>
</tbody>
</table>
Table 3. Participant Characteristics by Training Participation Status over 12 Months Follow-up

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=117)</th>
<th>Not participated training (N=58)</th>
<th>Participated training (N=59)</th>
<th>( \chi^2 ) df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal sector (vs. informal), No. (%)</td>
<td>69 (62.8)</td>
<td>37 (67.2)</td>
<td>32 (58.4)</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non licensed, No. (%)</td>
<td>87 (72.7)</td>
<td>44 (75.3)</td>
<td>43 (70.1)</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Age, mean (SD), y</td>
<td>43.6 ± 12.4</td>
<td>43.4 ± 12.2</td>
<td>43.9 ± 12.5</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Female sex, No. (%)</td>
<td>82 (70.2)</td>
<td>44 (74.8)</td>
<td>38 (65.7)</td>
<td>0.9</td>
<td>1</td>
</tr>
<tr>
<td>Race, No. (%)</td>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
<td>3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>55 (47.0)</td>
<td>27 (46.7)</td>
<td>28 (47.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>52 (44.8)</td>
<td>24 (41.9)</td>
<td>28 (47.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>7 (5.8)</td>
<td>6 (10.0)</td>
<td>1 (1.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (API/Native/other)</td>
<td>3 (2.4)</td>
<td>1 (1.4)</td>
<td>2 (3.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college or above, No. (%)</td>
<td>105 (89.7)</td>
<td>50 (85.9)</td>
<td>55 (93.5)</td>
<td>1.6</td>
<td>1</td>
</tr>
<tr>
<td>Baseline Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of direct services (+), by category</td>
<td>1.4 ± 1.4</td>
<td>1.2 ± 1.4</td>
<td>1.5 ± 1.4</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>How much you know about depression (+), mean</td>
<td>2.8 ± 0.7</td>
<td>2.8 ± 0.7</td>
<td>2.8 ± 0.7</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>of depression knowledge (-), mean</td>
<td>2.0 ± 0.6</td>
<td>2.0 ± 0.6</td>
<td>2.0 ± 0.7</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Personal depression Stigma (+), mean</td>
<td>3.8 ± 0.7</td>
<td>3.7 ± 0.7</td>
<td>3.9 ± 0.7</td>
<td>2.0</td>
<td>1</td>
</tr>
<tr>
<td>Perception of depression skill (+), mean</td>
<td>2.2 ± 0.7</td>
<td>2.2 ± 0.7</td>
<td>2.2 ± 0.6</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Perception of problem solving techniques (+), mean</td>
<td>2.6 ± 1.0</td>
<td>2.5 ± 0.9</td>
<td>2.7 ± 1.1</td>
<td>0.6</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 3. Participant Characteristics by Training Participation Status over 12 Months Follow-up

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=117)</th>
<th>Not participated training (N=58)</th>
<th>Participated training (N=59)</th>
<th>$c^2$†</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of depression Case Management task (+), mean</td>
<td>2.6 ± 1.1</td>
<td>2.6 ± 1.1</td>
<td>2.5 ± 1.0</td>
<td>0.0</td>
<td>1</td>
<td>.927</td>
</tr>
<tr>
<td># of system barriers (-), mean</td>
<td>0.8 ± 1.1</td>
<td>0.9 ± 1.2</td>
<td>0.6 ± 1.0</td>
<td>1.7</td>
<td>1</td>
<td>.194</td>
</tr>
</tbody>
</table>

†Chi-square test was used for a comparison between treatment and no treatment groups accounting for the cluster effect of providers nested in programs.

Instrumental Variable Analysis

Represented in Table 4 are the results of predicted outcomes by training participation status across intervention arms (instrumental variable analysis); that is, the direct effect of training participation on case manager outcomes. As shown in Table 3, in terms of primary outcomes, paraprofessional case managers across the intervention conditions who participated in depression case manager training reported significantly more use of evidence-based problem-solving counseling techniques at posttest than those who did not participate in training (scale score for nonparticipants was 2.59 (2.25, 2.93); for participants, 3.24 (2.87, 3.61); group difference, 0.65 (0.01,1.29), z 2.06, P<.05. In addition, participation in training, across intervention arms, was associated with increased case manager reported hours spent delivering services in community-based settings at posttest by the category of time: The nonparticipants’ reported category was, 0.48 (equal to roughly 30 to 45 minutes) (0.11,0.84); participants’ reported category was,1.4 (0.98, 1.82) or roughly (14 hours) a group difference, 0.93 (0.23,1.62), z 2.67 p<.05. The other
primary outcomes did not differ significantly between case managers who participated in trainings and those who did not. However, there was a marginally significant difference in perceived barriers to providing depression services in the environment. Case managers who participated in training perceived fewer barriers than their counterparts who did not participate at \( p = .07 \) (see Table 4).

Although not customarily completed on instrumental variable analyses for secondary outcomes, the results for both the Bonferroni and FDR multiple control methods are presented in Table 4a. As discussed in chapter 3, recall that a consequence to performing multiple comparison tests without methodological control is that with an increased number of tested hypotheses the probability of wrongly accepting a null hypothesis due to random chance increases. (Pike, 2011). Two approaches to control for multiple comparisons are to use the Bonferroni or the False Discovery Rate methods. The results for both methods are displayed in Table 4a.

| Table 4. Predicted Outcomes at Follow-up by Training Participation Status |
|---------------------------------|-----------------|-----------------|----------------|-----------------|
|                                 | No participated training (N=58) | Participated training (N=59) | Group-difference CI | z | p |
| Category of direct services hours (+) | 0.48 (0.11, 0.84) | 1.40 (0.98, 1.82) | 0.93 (0.23, 1.62) | 2.67 | .011 |
| Use of problem solving techniques (+) | 2.59 (2.25, 2.93) | 3.24 (2.87, 3.61) | 0.65 (0.01, 1.29) | 2.06 | .046 |
| Personal depression Stigma (+) | 3.76 (3.52, 4.01) | 3.94 (3.69, 4.20) | 0.18 (-0.30, 0.66) | 0.77 | .449 |
| How much you know about depression (+) | 2.70 (2.45, 2.96) | 3.03 (2.81, 3.25) | 0.33 (-0.12, 0.77) | 1.48 | .145 |
| Perception of depression knowledge (-) | 1.93 (1.62, 2.24) | 2.14 (1.67, 2.61) | 0.21 (-0.51, 0.92) | 0.58 | .566 |

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Table 4. Predicted Outcomes at Follow-up by Training Participation Status

<table>
<thead>
<tr>
<th></th>
<th>No participated training (N=58)</th>
<th>Participated training (N=59)</th>
<th>Group-difference 95% CI</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception of depression skill (+)</td>
<td>2.28 (2.05, 2.51)</td>
<td>2.43 (2.16, 2.70)</td>
<td>0.15 (-0.32, 0.62)</td>
<td>0.67</td>
<td>.507</td>
</tr>
<tr>
<td>Use of depression Case Management task (+)</td>
<td>2.79 (2.27, 3.30)</td>
<td>2.86 (2.33, 3.40)</td>
<td>0.08 (-0.92, 1.08)</td>
<td>0.16</td>
<td>.875</td>
</tr>
<tr>
<td># of system barriers (-)</td>
<td>0.84 (0.44, 1.24)</td>
<td>0.16 (-0.24, 0.57)</td>
<td>-0.68 (-1.40, 0.05)</td>
<td>-1.94</td>
<td>.065</td>
</tr>
</tbody>
</table>

*Instrumental analysis using STATA treatreg procedure adjusted for baseline status of the dependent variable, sector (formal vs. informal) and provider type (licensed vs. non-licensed) accounting for the cluster effect of providers nested in programs; data were multiply imputed and weighted for eligible sample for enrollment.

Table 4a. Predicted Outcomes at Follow-up by Training Participation Status (using multiple comparison control methods)

<table>
<thead>
<tr>
<th></th>
<th>Raw</th>
<th>Bonferroni</th>
<th>False Discovery Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of problem solving techniques (+)</td>
<td>0.0460</td>
<td>0.1380</td>
<td>0.0690</td>
</tr>
<tr>
<td>Use of depression Case Management task (+)</td>
<td>0.8750</td>
<td>1.0000</td>
<td>0.8750</td>
</tr>
<tr>
<td>Hours of direct services (+)</td>
<td>0.0110</td>
<td>0.0330</td>
<td>0.0330</td>
</tr>
</tbody>
</table>

Table 5 presents as a sensitivity analysis the simple unadjusted raw comparisons without using instrumental variable analyses, and shows the advantage of the instrumental variable approach. While results are broadly similar, in this version there appears to be a significant finding in perceived knowledge, which mirrors the known difference in baseline knowledge shown above in table 3. Through the use of the instrumental variable what is shown is that the result is not significant and this is probably due to the baseline differences. The results that were significant in the
instrumental variable analyses (time spent providing community services and reported use of problem solving techniques), are in a similar direction, but are not significant in this unadjusted version. However, accounting for observed and unobserved factors affecting selection into participation revealed a significant effect of training on problem-solving techniques and time spent providing community services.

### Table 5. Sensitivity Analysis of Unadjusted 12 month Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=117)</th>
<th>Not Participated Training (N=58)</th>
<th>Participated Training (N=59)</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of problem solving techniques (+), mean</td>
<td>2.9 ± 1.0</td>
<td>2.8 ± 1.1</td>
<td>3.1 ± 1.0</td>
<td>3.4</td>
<td>1</td>
</tr>
<tr>
<td>Hours of direct services (+), by category</td>
<td>0.9 ± 1.2</td>
<td>0.7 ± 0.9</td>
<td>1.2 ± 1.3</td>
<td>2.9</td>
<td>1</td>
</tr>
<tr>
<td>Use of depression Case Management (+), task</td>
<td>2.8 ± 1.2</td>
<td>2.8 ± 1.2</td>
<td>2.9 ± 1.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>How much you know about depression (+), mean</td>
<td>2.9 ± 0.7</td>
<td>2.7 ± 0.7</td>
<td>3.0 ± 0.6</td>
<td>5.2</td>
<td>1</td>
</tr>
<tr>
<td>Perception of depression knowledge (-), mean</td>
<td>2.0 ± 0.7</td>
<td>2.0 ± 0.7</td>
<td>2.0 ± 0.8</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Personal depression Stigma (+), mean</td>
<td>3.9 ± 0.7</td>
<td>3.8 ± 0.7</td>
<td>3.9 ± 0.6</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Perception of depression skill (+), mean</td>
<td>2.4 ± 0.7</td>
<td>2.2 ± 0.7</td>
<td>2.5 ± 0.6</td>
<td>3.3</td>
<td>1</td>
</tr>
<tr>
<td># of system barriers (-), mean</td>
<td>0.5 ± 0.9</td>
<td>0.7 ± 1.1</td>
<td>0.3 ± 0.7</td>
<td>3.5</td>
<td>1</td>
</tr>
</tbody>
</table>

†Chi-square test was used for a comparison between treatment and no treatment groups accounting for the cluster effect of providers nested in programs.
CHAPTER V
DISCUSSION AND CONCLUSION

The purpose of this dissertation was to test the efficacy of a community engagement intervention on the delivery of collaborative depression care by paraprofessional case managers in two low-income communities in Los Angeles (Hollywood-Metropolitan & South Los Angeles) with large numbers of African American and Hispanic families. Data gathered as part of a larger ongoing study (Community Partners in Care) were used (see, for example, Chung et al., 2010; Wells et al., 2013). Three main questions were addressed: (1) Can paraprofessional case managers be trained to deliver evidence-based depression support services similar to those described for professional case managers in the literature? (2) What are the effects of an intensive community engagement and planning implementation condition versus a time-limited technical-assistance-only implementation condition on paraprofessional case managers’ willingness to engage in evidence-based intervention strategies in the delivery of depression services in community settings? (3) What are the effects of actual exposure to evidence-based case manager training across the implementation intervention conditions on paraprofessional case managers’ use of problem-solving techniques for depression practice interventions, on the enhancement of their knowledge about depression, and on their attitudes toward the delivery of services to people with depressive symptoms?

Using problem solving and social cognitive theoretical perspectives, the principal predictions were that paraprofessional case managers who were exposed to the intensive community engagement and planning implementation intervention (experimental group),
compared to those who got the technical-assistance-only implementation intervention (control group) would demonstrate significantly higher scores at posttest on measures of evidence-based problem-solving intervention strategies, knowledge about depression and depression care, attitudes toward outreach and service delivery to people with depression symptoms, and would perceive fewer barriers with regard to providing depression services. It was further expected that there would be variation within and between the randomized intervention conditions in actual exposure of case managers to the depression trainings, given that randomization occurred at the program, rather than the individual case manager, level.

In this chapter, the findings are first summarized. The discussion section considers each question and hypothesis separately in the context of the theoretical perspectives and previous empirical evidence. The conclusion addresses the results broadly and suggests some implications for policy, practice, and future research.

**SUMMARY**

Case managers who were in agencies assigned to the intensive training condition (experimental group) were more likely than their counterparts in agencies assigned to the technical-assistance-only control group to participate voluntarily in the training sessions at their agencies. They also were more likely to score higher at posttest on measures of use of evidence-based problem-solving strategies, use of depression-oriented outreach activities in the delivery of case management services, and amount of time spent delivering direct depression care services in the community.
Contrary to expectations, there were no significant group differences at posttest (nor at baseline) between those who got the intensive training and those who got the technical-assistance-only training on the measures of perceived self-efficacy with regard to delivering depression care services, perceived knowledge about depression, and more positive attitudes (less stigma) toward people with depression and service delivery to such people. In addition, there were no group differences in perceived barriers at posttest within their local environments to providing depression services. It should be noted, however, that there were other trainings in both sets of agencies and case managers in both conditions could voluntarily attend as many trainings as they chose to attend. It is possible that this was a threat to internal validity, and the number of additional trainings attended by case managers in both conditions was not measured or controlled for. However, the analysis of actual exposure indicated that training was in fact a mechanism that positively impacted the paraprofessional case management outcomes. Still, it must be acknowledged that this study was not a true experiment; the randomization at the agency level and the voluntariness of participation by case managers rendered the design quasi-experimental for the reasons explicated in early chapters (see, also, Campbell & Stanley, 1963).

**DISCUSSION**

In the paragraphs that follow, the research questions and hypotheses are considered separately. They are discussed in the context of the theoretical perspectives, previous empirical evidence, and some considerations for future work.
Research Question 1: Can paraprofessional case managers in social welfare and healthcare organizations in low-income communities of color be trained to deliver depression support services similar to those described for professional care managers in the literature? The present findings suggest strongly that paraprofessional case managers in social welfare and healthcare organizations can be trained to deliver depression care services in underserved communities similar to those delivered by professional case managers. Case managers in agencies assigned to the community engagement and planning implementation condition were significantly more likely than those in agencies assigned to the technical-assistance-only implementation condition to participate in the proffered training sessions at their respective agencies. This finding is further demonstrated by the findings for questions two and three.

Research Question 2: What are the effects of the overall community engagement and planning implementation condition for collaborative care for depression versus the technical-assistance-only condition on the capacities and competencies of nonprofessional case managers to support depression services? For this question, five hypotheses were tested.

Hypothesis 1: Community engagement and planning implementation would be associated with greater participation by paraprofessional case managers in evidence-based depression care training (primary outcome): As noted above, there was a significant increase in case management participation in depression trainings under the community engagement intervention. Paraprofessional case managers in agencies assigned to the intensive training condition were nearly 3 times more likely to participate in the proffered training than their counterparts in agencies assigned to the technical-
assistance-only condition. This finding suggests substantial staff capacity building, especially, in light of the fact that training participation was voluntary. Others have noted that information given to prospective participants prior to the receipt of training, like that provided at the kick-off conference, can improve participant training self–efficacy and training motivation (Wei-Tao, 2004). Individuals with high training self-efficacy are more likely to participate in training (Carlson, Bozeman, Kacmar, Wright, & Mc Mahan, 2000). However, in this study both intervention arms had the same opportunities to participate in the pre-training kick-off conference and thus had the same priming effect. Within the framework of social cognitive theory, the intensive trainings were didactic, with a greater focus on in-person guidance, including skills-building exercises (self-efficacy); the modeling of depression case management techniques (observational learning); peer support; peer and agency networking; and encouragement of intra- and inter-agency collaboration. Participating agencies were focused on delivering depression care (collective efficacy) and on increasing the sharing of information and resources among agency administrators, licensed professional staff, and paraprofessional case managers (reciprocal determinism).

Social cognitive theory (Bandura, 1978, 1982, 1998) proposes that such processes are associated with feelings of self-efficacy (Mc Alister, Perry, & Parcel, 2008). Self-efficacy, in turn, has been shown to improve motivation, learning, and training performance (Colquitt, LePine, & Noe, 2000; Quinones, 1995; Wei-Tao, 2004). It is important to note that although the level of participation in the trainings was much higher among case managers in the agencies assigned to the intensive training condition, the rate of staff participation was still less than 50%. Future research should focus on ways to
strengthen participation beyond that achieved in this study. Increasing participation will be especially important for the implementation of similar models under the Affordable Care Act with expanded Medicaid, which may require additional capacity building. Theoretical perspectives that might inform efforts to increase participation in interventions focused on improving the skills of paraprofessional case managers in the future might include the theory of planned behavior (Montano & Kasprzyk, 2008) and the integrated behavioral health model (Montano & Kasprzyk, 2008). Both have a strong focus on peer and expert opinion, modeling, and evidence-based service delivery.

Hypothesis 2: Community engagement and planning implementation would be associated with higher scores at posttest on self-reported measures of use of evidence-based, problem solving (therapeutic) strategies for depression and use of depression-oriented outreach and case management activities (primary outcomes). Paraprofessional case managers in agencies assigned to the intensive training condition reported significantly higher use of evidence-based concordant problem-solving depression strategies than their counterparts in the technical-assistance-only condition. However, no significant difference was found in reported use of general case management activities for depression (i.e., explaining what depression is, making a referral to depression care service). Regarding the latter, the direction of the effect was consistent with the hypothesized expectation, as was the case across all the primary outcomes. Since the Bonferroni method was used, and it is very conservative, the False Discovery Rate was also carried out to determine whether the difference between the two conditions for use of problem-solving techniques would remain nonsignificant. Indeed, when the False Discovery Rate was applied, the difference between the two groups on this variable
became significant, with case managers who received intensive training scoring significantly higher than their counterparts who received technical assistance only.

Finding a main intervention effect on the reported use of problem-solving skills is important, because it suggests that paraprofessional case managers can be trained to deliver evidence-based intervention services in underserved low-income communities. Given the paucity of available professionally trained social workers, this finding suggests that task shifting key collaborative care components to paraprofessional case managers may be possible if appropriate supervision is available in community agencies.

Hypothesis 3: Community engagement and planning implementation would be associated with greater participation at posttest in delivering services in community-based settings (primary outcome of importance from community capacity-building perspective). Paraprofessional case managers in agencies assigned to the intensive training condition reported spending a significantly greater amount of time delivering direct depression care services in the identified undeserved communities as compared to their counterparts in the technical-assistance-only condition. This effect on direct service provisions in community settings, combined with greater use of problem-solving skills, suggests that clients being served in these community settings received greater amounts of therapeutically oriented depression care services. Secondly, this finding indicates that agencies both re-allocated the amount of time available for providing depression care services, but also the amount of time spent out in the community providing those services. One possibility for the re-allocation is that agency involvement in the present study facilitated change due to an increased interest in the more exploratory secondary outcome of change in perceived system support for depression services.
Hypothesis 4: Community engagement and planning implementation would be associated with higher scores at posttest on the measures of perceived knowledge about depression, positive attitudes about delivering depression services to people with depression symptoms, and positive attitudes toward clients experiencing depression (secondary outcomes exploratory). No significant difference was found between the case managers in the experimental and control groups in their perceived depression knowledge and in reported attitudes (such as stigma vis-a-vis depression) in delivering depression care services or toward people experiencing depression. This may be an area for future research using a more experimental design, given that case managers in both the experimental and control group had access to multiple trainings that were not controlled for.

Hypothesis 5: Community engagement and planning implementation would be associated with fewer perceived barriers to providing depression services. No statistically significant difference between the two groups of case managers was found. The results were marginal, with the trend leaning towards those in the intensive case management condition perceiving fewer barriers to depression care delivery. This also may be an area for future research using a more experimental design.

Research Question 3: What is the effect of actual exposure to case manager training for depression services across the implementation conditions on the capacities and competencies of nonprofessional case managers to support depression services? The results for hypotheses 6-9 using instrumental variable analyses to account for unobserved effects, demonstrate the impact of training exposure on paraprofessional case managers.
Case managers, who participated in training, were significantly more likely to report the use of problem-solving techniques than those who did not participate in training. Additionally, participation in training across intervention conditions greatly increased the amount of time that case managers reported delivering depression care services to underserved communities. Thus, direct training exposure was associated with increased time interacting with clients in community settings as well as using more therapeutically oriented problem-solving techniques. This demonstrates a change in both the type of care delivered and the location in which care was provided. The fact that the results are the same as those described for hypotheses 2 through 5 indicates that the study controlled adequately for the quasi-experimental group-randomization design. In sum, these findings suggest that paraprofessional case managers can be trained to provide therapeutically oriented, evidence-based depression care services. What has also been shown, is that after exposure to the more intense training under the community engagement implementation approach, case managers in the experimental group spent more time than their counterparts in the control group delivering needed depression care services in urban communities of high need. Among the three primary outcomes (greater use of evidence-based problem-solving strategies, greater use of depression-oriented outreach and greater use of evidence-based case management activities), two were statistically significant, even after the application of the False Discovery Rate to control for multiple comparisons; that is, those who got the more intensive training, in comparison to their counterparts who did not, showed greater use of evidence-based problem-solving and greater use of depression-oriented outreach. They also spent more
time delivering services (a secondary outcome). These findings show strong support overall for the effect of the intervention, given the limitations of the design.

CONCLUSION

As stated at the outset, under-resourced communities of color often have low access to professional providers of evidence-based depression services. This study suggests that paraprofessionals with the appropriate training and supervision can help extend mental health care capacity and that a collaborative care approach to depression can be achieved in under-resourced communities. The more effective community engagement model, as implemented, is best thought of as a community academic partnership that uses interdisciplinary teams to deliver collaborative depression care. Under this framework the communities that participated in this study are now receiving more appropriate services through usual providers enhanced by and supporting paraprofessionals to augment and extend their reach.

Further, it is suggested that communities or systems seeking to implement collaborative care in expanded markets might also consider using a community engagement and planning approach that also includes paraprofessional case managers. A collaborative approach such as this could be incentivized through either agency or community coalition grants, like those that have been recently proposed through HRSA, SAMSHA, and the Blue Shield Foundation. The goal of funding these types of activities is to create environments for integrating behavioral health into primary care clinics and Federally qualified health centers. At present the majority of these opportunities, understandably, focus on the inclusion of licensed providers as a part of the medical
team. This study used a much broader network of community-based agencies ranging from social services, faith based, exercise clubs, parks and recreation centers, as well as other community based service sectors. It is hoped that the results from this study will start a conversation around the inclusion of paraprofessional case managers given the expanding need for services under the Affordable Care Act. Such an inclusion could potentially be helpful for underserved and under-resourced communities.

Concerning the present study, there are several limitations that should be acknowledged. One limitation is the sole reliance on self-reported surveys to measure constructs without coupling these measures with practice observations or chart reviews. Actual case manager practice may in fact differ from what was reported. Additionally, there were few survey items directly measuring some of the constructs suggested by the social cognitive theoretical perspective. Although there were 95 agencies in this study, it was limited to only two communities in Los Angeles, and its findings need to be replicated. The sample size is also limited for observing smaller effects, which may be typical for non-mandated training using a public health implementation design. This study relied upon group level randomization, which could lead to non-comparable providers within groups. However, in this case the randomization strategy worked and the groups were well balanced on measured characteristics. As previously stated, a limitation of this model’s design for estimating direct training effects is the potential for selection bias from the non-randomization of training; but advanced statistical techniques to account for this were used, and they are well suited to this design. There was also some turnover in providers within programs over time so there is some sample loss, which we have been accounted for with attrition weights. Turnover, however, is to be expected in
economically unstable programs in under-resourced communities of color and may be unavoidable even in future studies. As previously discussed, not incorporating additional relevant practice change theories may have also been a limitation. Understanding theoretical constructs that might yield important information on the strength of opinion leaders or the impact of social influence and practice during trainings was also needed. Furthermore, this could be an important direction for future studies.

The strengths of the study include the large number of agencies and programs participating, the cultural diversity of the communities and providers, the randomization of agencies, and the range of measures available on relevant outcomes, such as participation in training, use of specific techniques, and time spent in community services to name a few.

Furthermore, this dissertation demonstrates that paraprofessionals can be trained to provide supervised collaborative depression care services. This approach can be used to extend care where none exists or to provide complimentary community based services. Based upon the findings of the CPIC and this dissertation, the County of Los Angeles Department of Mental Health has decided to use a similar model focused on faith based providers and staff for its main response for increased Medicaid service demand under the Affordable Care Act. Their healthy neighborhood approach offers an opportunity for the replication of this study on a much larger scale and will potentially allow for the opportunity to observe the direct policy consequences from the application of our work.

**Implications for Future Research**

Understanding how behavior and practice are changed and which components influence case manager attitudes may be an important avenue for future studies to
explore. Building on the findings of this study by identifying the most active components might lead to even greater practice change, or increased knowledge acquisition. Further, future research should focus on how to seamlessly integrate social cognitive theory and or theory of planned behavior into the intervention framework and design. Doing so may improve both provider and client outcomes. It is imperative that future efforts focus on how to sustain the achieved changes and improve access to appropriate resources, support training and services delivered by paraprofessional caseworkers.

Although social cognitive theory provides a sound theoretical framework for this dissertation, it has to be recognized that no one theory can fully explain these results or the phenomena of how people learn or adopt new practices (Gibson, 2004). Building upon the findings in CEP, future research incorporating the theory of planned behavior (TPB) (Ajzen, 1991; Montano & Kaspryzyk, 2008) which has a focus on individual motivational factors that determine if a behavior, such as practice change is likely to occur (Montano & Kaspryzyk, 2008) or use a Quality Enhancement Research initiative (Queri) framework used at the Veterans Administration. The Quality Enhancement Research initiative framework emphasizes the integration of provider practice change research into quality improvement cycles (Rubenstein, Mittman, Yano, & Mulrow, 2000) in order to enrich both the intervention and its sustainable adoption over time. Incorporating this approach into the intervention may encourage even greater practice change that would further improve the delivery of depression care services.

Finally, this dissertation makes an important contribution to the knowledge base of collaborative depression services implementation, particularly in urban underserved areas with high need. The study shows—under real life circumstances—that
paraprofessional case managers can be trained to deliver very basic therapeutically oriented depression services. Additionally, it shows that a community engagement intervention protocol focused on engaging administrative leadership in multiple community based agencies, can yield a high rate of staff participation in training. This type of research is of particular importance given the anticipated increased demand for services under the Affordable Care Act. It is believed that the use the Community Engagement and Planning approach to depression care will enable the provision of a richer, more culturally aware and in depth approach to care.
Appendix 1.

51 Agencies Housing 95 Programs

95 Programs Were Randomized to Either RS or CEP

117 Paraprofessional Case Managers

59 Case Managers from Agencies Randomized to RS

58 Case Managers from Agencies Randomized to CEP
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