

## Does Shared Decision Making Improve Care at Community Mental Health Clinics?

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**Original Project Title:** Researching the Effectiveness of a Decision-Support Tool for Adult Consumers with Mental Health Needs and their Care Managers

**PCORI ID:** CE-12-11-4309

**HSRProj ID:** 20143042

**ClinicalTrials.gov ID:** NCT02761733

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To cite this document, please use: Chu J, Reeve A, Milan N, et al. 2019. *Does Shared Decision Making Improve Care at Community Mental Health Clinics?* Washington, DC: Patient-Centered Outcomes Research Institute (PCORI). <https://doi.org/10.25302/2.2019.CE.12114309>

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## **Abstract**

Background: Shared decision making (SDM) is a collaborative client–provider interaction that aims to encourage clients’ self-efficacy and voice in treatment decision making. SDM needs to be extended from medical settings to diverse clientele with complex mental health and social needs in community mental health (CMH). The Moving Patient Outcomes toward Wellness and Recovery (mPOWR) system is a CMH-based SDM tool and training package that spans multiple life-functioning and community living skill domains.

Objectives: This study investigated the effectiveness of mPOWR in diverse urban and rural CMH settings, with primary aims to (1) improve client and provider participation in SDM and engagement in mental health treatment; (2) increase client understanding of treatment and personal treatment progress; and (3) increase client functionality, personal quality of life, and perceived support for their therapeutic outcomes. As secondary study aims, study exit interviews provided qualitative data to ascertain general impressions of mPOWR and perceived barriers and benefits of mPOWR.

Methods: In a quasi-experimental design, 240 existing clients (60 per clinical study site) who met study eligibility criteria (over 18; participating in CMH services for a serious mental health need in 4 target sites; able to provide informed consent; proficient in English, Spanish, or Chinese; and lacking a primary substance use disorder) were randomly selected for study inclusion. Clients in one pair of urban and rural intervention sites received mPOWR, and clients in the other pair of control urban and rural sites received CMH treatment as usual. Clients were followed every 6 months over 24 months. Primary outcomes were treatment engagement and SDM participation as measured by decision satisfaction and communication satisfaction, client understanding of treatment options, and perceived therapeutic support via a working alliance with providers. Secondary outcomes were treatment progress, global quality of life, and client functionality as measured by mental and physical health. Latent growth curve analyses compared study outcomes over time between intervention and control groups.

Results: mPOWR did not yield greater improvement in primary or secondary outcomes compared with treatment as usual. Instead, the most robust effect was driven by urban (in older adults) versus rural (all adults) location, with urban participants reporting lower baseline levels on treatment engagement and participation in SDM, perceived therapeutic support, treatment progress, general quality of life, client functionality, and treatment understanding (in the urban control site). Urban sites also reported greater declines in treatment engagement and SDM participation, working alliance, treatment understanding, and treatment progress and global quality of life in later study time points. Qualitative exit interview data suggested that external factors (institutional or client life events) and implementation challenges were the most salient barriers to mPOWR effectiveness, not the structure or content of mPOWR itself. Some clients reported positive experiences and perceived benefits from mPOWR.

Conclusions: SDM interventions with clients with mental illness in CMH settings did not affect any study outcomes. More effectiveness and treatment adaptation research is needed to further investigate how to promote the successful use of interventions like mPOWR for behavioral health issues in CMH.

## **Background**

Research finds that shared decision making (SDM) is an important tool in helping clients self-manage a range of physical and mental health conditions.<sup>1,2</sup> Despite these promising findings and despite that SDM is a core component to many evidence-based approaches in health care, SDM is still not commonly implemented in mental health treatment and little research has been done on the impact of SDM practices when employed by care managers operating in community settings. Because clients express a desire for more information and more involvement in care planning, and because individuals with mental health diagnoses often manage comorbid physical conditions,<sup>5-8</sup> researchers must explore new and innovative ways to increase client involvement in mental health care planning and to increase practitioner deployment of SDM and other practices that engage the client. mPOWR is a training package and decision-making and service-planning toolkit that was codeveloped by clients and care

providers to promote client-centered outcomes; it includes decision aids (DAs), communication strategies, and prompts designed to facilitate more consistent use of SDM strategies by care managers. The current study tests the mPOWR model in rural and urban community mental health (CMH) settings and examines whether mPOWR will improve client functional outcomes and quality of life, increase client satisfaction, and improve client–practitioner relationships.

### **A Need for Innovation in Public Mental Health**

The public health costs of mental illness are exceedingly high in impairment, health care expenditures, and lost productivity at work, school, and home owing to disability or premature death.<sup>3,4</sup> Given the breadth and depth of burden that mental illness places on the public sector and the scope of human suffering that results from untreated or poorly treated mental health conditions, increased research is warranted to examine ways to improve care outcomes by increasing client involvement in care.

One approach to reduce the direct and indirect costs to public health is to capitalize on the unique expertise that clients with chronic health conditions have in managing these conditions. A comprehensive review of the self-management education literature shows that education and knowledge alone are poorly related to positive health outcomes, although data are mixed.<sup>9,10</sup> Instead, client–practitioner partnerships that extend beyond education and information sharing and empower clients to take a more active role in shared decision making (eg, through goal formation, problem solving, and self-management) should be key areas of focus. For example, in a study of asthma and arthritis self-management, clients who participated in goal setting and action planning were more successful in meeting their goals than clients in a skills-education-only intervention.<sup>6</sup>

The aforementioned findings have clear implications for behavioral health. Clients with mental illness have long sought to be more involved in decision making about medications and hospitalizations.<sup>7,8</sup> Despite this desire and the evidence that individuals with serious mental illness are able to understand treatment options and participate in decision making,<sup>11</sup> clients with serious mental illnesses report that their role in treatment is largely passive.<sup>12,13</sup>

Specific barriers to SDM utilization in mental health situations may contribute to the

historical dearth of its use in community mental health. For example, previous research on barriers to shared decision making in mental health treatment may be particularly relevant, or even enhanced, in a community mental health setting. Individual or cultural differences for participation in shared decision making may yield differing levels of receptiveness to SDM.<sup>14</sup> In addition, barriers have included concerns about medication use that makes client participation in SDM more difficult, the competence and ability of clients with serious mental illness to fully participate in SDM, and a preference by providers to rely on their own clinical intuition about client readiness to participate collaboratively in treatment.<sup>15-17</sup> Other literature indicates that many clinicians have reservations about clients' ability to make sound decisions,<sup>18</sup> and many clients do not believe practitioners are willing to share responsibility for treatment decisions.<sup>19</sup>

### **Shared Decision Making**

Shared decision making may constitute a viable and innovative approach to addressing the public health burden of mental health care. SDM has been found to contribute to improved health outcomes in diabetes care<sup>20</sup> and for a variety of other physical and mental health conditions,<sup>1,2</sup> and has been defined as the collaboration between clients and care managers to achieve a shared agreement about health care decisions. When SDM is practiced, the care manager offers the clients information that will help them understand the likely outcomes of various options, think about what is personally important about the risks and benefits of each option, and participate in decisions about medical care.

For more than a decade, the Institute of Medicine (IOM)—now the National Academy of Medicine—has advocated for the use of SDM as a strategy for placing control in the hands of clients, accommodating client preferences and differences, and facilitating the flow and transparency of service-related decisions and information.<sup>21</sup> In a 2009 report brief, the IOM listed research investigating the role of SDM on decision outcomes, the effectiveness of client decision-support tools on diagnostic and treatment decisions, and the effectiveness of care coordination with and without decision support among its top 100 national priority areas for comparative effectiveness research.<sup>22</sup> Specific priorities included “compare[ing] the effectiveness of client decision support tools on informing diagnostic and treatment decisions . .

. in clients with . . . mental health problems.”<sup>22</sup>

While research on SDM in mental health is relatively new, several randomized controlled trials support its effectiveness in patients with mental health conditions regarding greater client satisfaction, involvement in treatment and decision making, and improved symptom outcomes.<sup>23-29</sup> For instance, SDM was found to contribute to greater client satisfaction among individuals with schizophrenia<sup>23</sup>; SDM sessions with individuals with depression achieved greater adherence to therapeutic regimens and improved symptom outcomes.<sup>24</sup> Another randomized study with clients with schizophrenia found an increase in knowledge and perceived involvement in treatment among clients while they were hospitalized and 1-year posthospitalization,<sup>25</sup> and clients in an experimental group involved in a cluster randomized design study experienced fewer unmet needs, improved perceived quality of life, and greater satisfaction after participating in a treatment that used computer-mediated interventions to structure the client–practitioner relationship.<sup>26</sup> In another randomized study, clients in the experimental group who were depressed reported greater participation in decision making and greater satisfaction with care.<sup>27</sup> In a residential treatment program for addiction, clients in the experimental group at the 3-month follow-up had greater reductions in drug use and psychiatric symptoms.<sup>28</sup> Finally, in yet another randomized trial during a single session of treatment planning between clinicians and individuals with serious mental illnesses, a greater percentage of providers in the experimental group reported that decisions were more collaborative.<sup>29</sup>

Further solidifying the importance of advancing SDM as a common behavioral health practice is the degree to which SDM is either explicitly or implicitly a core component of many evidence-based practices. Emphasis on SDM is found in components of integrated treatment of dual disorders,<sup>30</sup> behavioral family therapy,<sup>31</sup> illness management and recovery,<sup>32</sup> and systematic medication management.<sup>33</sup>

While the use of SDM in behavioral health settings appears to be strongly supported by previous research, all but one of these studies examined the relationship between psychiatrist and client. Also, most of the studies focused on changes in symptoms or adherence to

medication regimens, and fewer focused on client-identified outcomes, quality of life, or outcomes related to improved functioning. Measuring outcomes at short time intervals helps to validate SDM as an approach but does not demonstrate sustained participation by clients in the decisions relevant to their care or longer-term outcomes. Our study addressed these shortcomings in the body of evidence.

### **Decision Aids**

Decision aids (DAs) are often utilized as a primary strategy for supporting the effective participation of clients in SDM<sup>34</sup> and are defined as “information interventions that help clients to understand the pros and cons of a medical decision that may also include exercises to help the client clarify their own values and preferences.”<sup>35</sup> In the case of chronic conditions, including mental illness, decision making is a continuous process that can use DAs over an extended period of time and focus holistically on decisions related to housing, employment, education, and budgeting, in addition to the medical and behavioral aspects of care.<sup>34</sup> DAs can assist with client capacity to partner effectively in SDM processes, foster client problem solving, and enable clients to incorporate quality of life issues into decision-making processes. To date, most published research on the use of DAs in mental health has focused on psychiatric care and treatment of specific diagnoses with psychotropic medications.

### **A Shared Decision-making Intervention: The mPOWR**

The Moving Patient Outcomes toward Wellness and Recovery (mPOWR) system is a CMH-based decision support tool and training package that includes a combination of community-adapted quality of life and community living skill measures with decision aids spanning multiple life functioning domains (see Appendix for the training and intervention materials). mPOWR includes best practices in client decision-making support, including shared decision-making approaches, decision aids, and provider guidance in strategic communications, to help clients understand their preferences and values, identify available service options, and participate in informed decision making about care. Taken together, this system of assessment and decision support tools and communication strategies, sustained through coaching and supervision, is designed to create a practice that encourages client involvement in care planning and care decisions, and focuses on client-identified goals related to quality of life and



functioning. mPOWR includes the use of client-focused DAs that focus on (1) personal care and daily life skills, (2) social relationships, (3) environment and activities, (4) volunteer and vocational skills, (5) physical health, and (6) psychological health. Depending on the content covered, we followed International Patient Decision Aid Standards (IPDAS) in the development of each DA. Although many of the IPDAS do not apply because the mPOWR addresses multiple options for improvement of quality of life issues rather than one specific medical decision, we incorporated portions of the following standards in the development of the DAs: Standard 2 (Providing information about options), Standard 4 (Clarifying and expressing values), Standard 6 (Guiding/coaching in deliberation and communication), Standard 10 (Using plain language), and Standard 11 (Basing information on up-to-date scientific evidence).

For case managers to be continuously vigilant of opportunities to encourage SDM, a toolkit of communication strategies helps structure communications within the relationship and makes it easier for case managers to operationalize intended practice change using DAs and SDM processes.

mPOWR is also innovative in its use of community-adapted quality of life and community living skill measures that mirror the domains of the mPOWR decision aids; it allows case managers to track consumer progress and informed decision making within the SDM process. Specifically, mPOWR utilizes the physical and mental health, personal beliefs, social relationships, and environment domains of the 26-item World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF)<sup>36</sup> and the personal care, socialization, relationships, activities and leisure skills, and vocational skills community life domain indicators of the Daily Life Experiences Scale, a community-modified version of the Community Living Skills Scale (CLSS).<sup>37,38</sup> Together, the tracking of progress over time on the WHOQOL-BREF and CLSS allows consumers and providers to make service decisions that are consistent with a recovery focus integrated within an SDM approach.

All these components work together to achieve the desired goals of mPOWR. For example, if the client rates strong dissatisfaction with his or her access to services and capacity to work on the assessment instruments of the mPOWR, a care manager would utilize communication strategies from the toolkit to engage the client in a “drill-down” discussion

about their specific needs, preferences, and priority areas. DAs on vocational skills and physical health would be reviewed to facilitate a dialogue between the care manager and client that involves presenting information and service options, including evidence-based and best practice strategies for supporting employment and coordinating health services. Clients interested in utilizing mPOWR to actively engage in improving different life domains or their quality of life could request the mPOWR intervention and its decision aids and tools from their providers.

Overall, mPOWR incorporates the use of tools, communication strategies, prompts, and DAs that precisely operationalize SDM approaches for community mental health. mPOWR has not been previously evaluated in any health care setting, nor for specific use by case managers in a CMH setting.

### **Present study**

In a September 2012 report, the Institute of Medicine (now the National Academy of Medicine) cited client-centered care as a recommendation for addressing the challenges associated with a complex, high-cost health care system that has demonstrated “outcomes below the system’s potential,”<sup>39</sup> with the recommendation of developing clinician skills and using reliable tools to inform SDM. Clearly, research needs to focus on determining the degree to which clients, largely working with case managers or peer support workers, can improve their functioning and quality of life as a result of a low-cost change in care management practice. The proposed study contributes to the existing literature by investigating SDM’s impact on the quality and outcomes of care available from providers within the public mental health sector. Additionally, the current study extends the use of DAs for SDM approaches into uncharted territory, focusing on daily living and client participation in treatment and incorporating a range of communication strategies and prompts that encourage the use of DAs and SDM. More specifically, this study compared the use of SDM and decision support aids via the mPOWR intervention with usual care in improving outcomes in the delivery of mental health services for individuals with chronic mental illnesses.

Based on previous research that showed that SDM may contribute to improvements in the client–provider relationship, satisfaction with care, quality of life, treatment adherence, and

health outcomes for individuals with mental illness,<sup>23-29</sup> the present study focused its investigation of SDM in community mental health on similar treatment process and outcome variables. Specific study aims are as follows:

*Primary Aim:* Investigate whether the mPOWR shared decision-making intervention (1) improves client and provider participation in shared decision making and engagement in mental health treatment, (2) increases client understanding of treatment and of treatment options (a concept that is connected to the first primary aim of increasing shared decision making), and (3) increases the client's perception of support for their therapeutic outcomes.

*Primary Hypothesis:* Compared with usual care conditions, community mental health clients engaged in the mPOWR shared decision-making intervention will report greater improvement over a 2-year period in the primary study outcomes of treatment engagement and participation in SDM via decision satisfaction and communication satisfaction, client treatment understanding, and perceived therapeutic support via working alliance.

*Secondary Aim:* Investigate whether the mPOWR shared decision-making intervention (1) increases clients' personal treatment progress and general quality of life and (2) increases client functionality.

*Secondary Hypothesis:* Compared with usual care conditions, community mental health clients engaged in the mPOWR shared decision-making intervention will report greater improvement over a 2-year period in the secondary study outcomes of treatment progress and general quality of life, and client functionality via mental and physical health.

*Tertiary (Exploratory) Aim:* Utilize qualitative data from study exit interviews to ascertain general impressions and memory of the mPOWR intervention, and perceived barriers to and benefits of participating in mPOWR.

### **Engagement of Stakeholders**

Stakeholder involvement in the program's design, development, and research was a core foundation of all clinical sites' mission and values, and of the current research study. The mPOWR itself was a product of a 5-year development effort led by a consumer, caregiver, provider, and research collaborative Community Advisory Committee, along with input from numerous consumer activists and providers. Stakeholders also provided input and direction for

the implementation of the intervention and the study-related research activities. Two main advisory boards provided the structural basis for integrated stakeholder input. All advisory board members were recruited by referral from the staff and client stakeholder community of the study's 4 clinical sites. Specifically, the Clinical Advisory Board (CAB) met to assist in the initial review and revision of the mPOWR materials for consumer perspectives and guidance of clinical implementation portions of the project. The Research Advisory Board (RAB) also met monthly to oversee the management of data collection, interviews, and data management. The RAB was created to oversee all aspects of research and had input on the identification of the research questions, the design of the research approach, the modification of consent forms to be consumer-friendly, and the selection of instruments to be used. Specific feedback from peer consultants directed the initial aspects of SDM that were studied, by ensuring that the research questionnaires were aiming to elicit responses about the amount of time spent on, and quality of, the interpersonal interaction between client and provider. Thus, the researchers narrowed and refined the initial set of research questions following the baseline (T = 0) administration of the questionnaire, with the help of the RAB, in response to participant feedback.

The CAB members included the training director for the urban clinic sites, the study principal investigator, program managers, a peer educator, a peer provider and psychiatrist in community mental health from the urban site's surrounding area, an expert in shared decision making, a care manager from the rural sites, and a peer advocate from the rural site's surrounding area. Members were chosen based on their expertise in shared decision making, their familiarity with the challenges faced by consumers of community mental health services, and their desire to improve consumer engagement and shared decision making in behavioral health. The CAB members were all equal contributors to the process of reviewing and modifying the decision support tools and supervisor training manual, providing feedback for the online training component of mPOWR, and participating in regular meetings to discuss obstacles and solutions to the adoption of mPOWR. All CAB meetings were held via videoconference, which allowed for face-to-face interaction despite distance barriers, electronic sharing of draft intervention tools, and collaborative problem solving of adoption challenges.

The RAB's members were selected based on personal contacts and recommendations for their experience or perspectives. The RAB consisted of the research team members (the research lead investigator and research assistants) and other peer advocates. Specifically, 2 client stakeholders (not enrolled in the study) and 2 case managers (1 each from the urban and rural site areas) participated. The peers had lengthy experience with their own mental illness and client services from outpatient mental health centers; both were in substantial recovery and able to be both strong advocates and dispassionate about the impact of providers' language or attitude. The case managers had many years of experience working in mental health care and with disadvantaged youth or adults with intellectual and developmental disabilities. They voiced concerns for proper advocacy, client rights, and adherence to privacy standards. The RAB members received a small stipend for their efforts. The discussions were frank, direct, and thoughtful, with recommendations incorporated into data collection instruments between the first and second rounds of outcome measures administration. The RAB was also mentored by an experienced clinical researcher.

Engagement of monolingual Chinese-speaking clients required special attention from trained interpreters to bridge language gaps. The interpreters provided an opportunity for Chinese clients to use their own language in the data collection portions of the study, and for research assistants to more easily schedule and complete study questionnaires with Chinese study participants.

### **Results of Engagement Efforts**

Stakeholder engagement efforts yielded several changes throughout the course of the study. First, revisions were made to the content and format of the mPOWR decision aids. Client/consumer members of the CAB provided critical feedback on ease of use, appearance, and language used in the decision aids and were instrumental in revisions early in the implementation process. RAB members contributed to the development of and revisions to research protocols and research check-ins.

Second, consumer perspectives from the CAB were instrumental in providing community insights that assisted the research team in navigating leadership changes (eg, by facilitating meetings with the new site directors) and implementation challenges resulting from

organizational and client cultures at the intervention sites. For example, CAB members consulted on a plan to provide more in-depth and individualized consultation to mPOWR providers when enthusiasm for adoption appeared to wane. Third, RAB members also provided insight into strategies to encourage both client and provider participation in the setting of staff turnover, low staff morale, and high client concerns about loss of services. Strategies included gentle phone messages, assurances of the participant's confidentiality, and the sharing of urgent needs that had not come to the attention of staff. Fourth, stakeholder input resulted in the creation of video materials designed to increase client, provider, and public engagement with the mPOWR intervention. Finally, conference presentations of project results were co-created by CAB members and peer providers.

Overall, stakeholder involvement throughout the research process allowed for the integration of consumer perspectives, voices, and leadership that facilitated the implementation of the mPOWR intervention in a notoriously difficult to engage CMH population. Although the adoption and fidelity of mPOWR remained a significant challenge and limitation for study results, the engagement of stakeholders mitigated the impact of significant organizational and implementation challenges throughout the project.

## **Methods**

### **Study Overview**

Study aims of evaluating the effectiveness of the mPOWR SDM intervention in a community mental health setting were achieved by administering the mPOWR intervention versus treatment as usual with existing clients across 4 clinical sites (1 urban intervention, 1 urban control, 1 rural intervention, and 1 rural control community mental health site). Clients in the urban and rural intervention sites received the mPOWR intervention, and control sites received CMH treatment as usual, with urban versus rural locales allowing for the examination of location effect across a diversity of CMH settings. All clients were followed over 24 months, with primary outcomes (treatment engagement and participation in SDM via decision satisfaction and communication satisfaction, client treatment understanding, and perceived therapeutic support via working alliance) and secondary outcomes (treatment progress and general quality of life, and client functionality via mental health and physical health) assessed

every 6 months. Latent growth curve analyses compared study outcome scores over time between intervention and control groups.

### **Study Design**

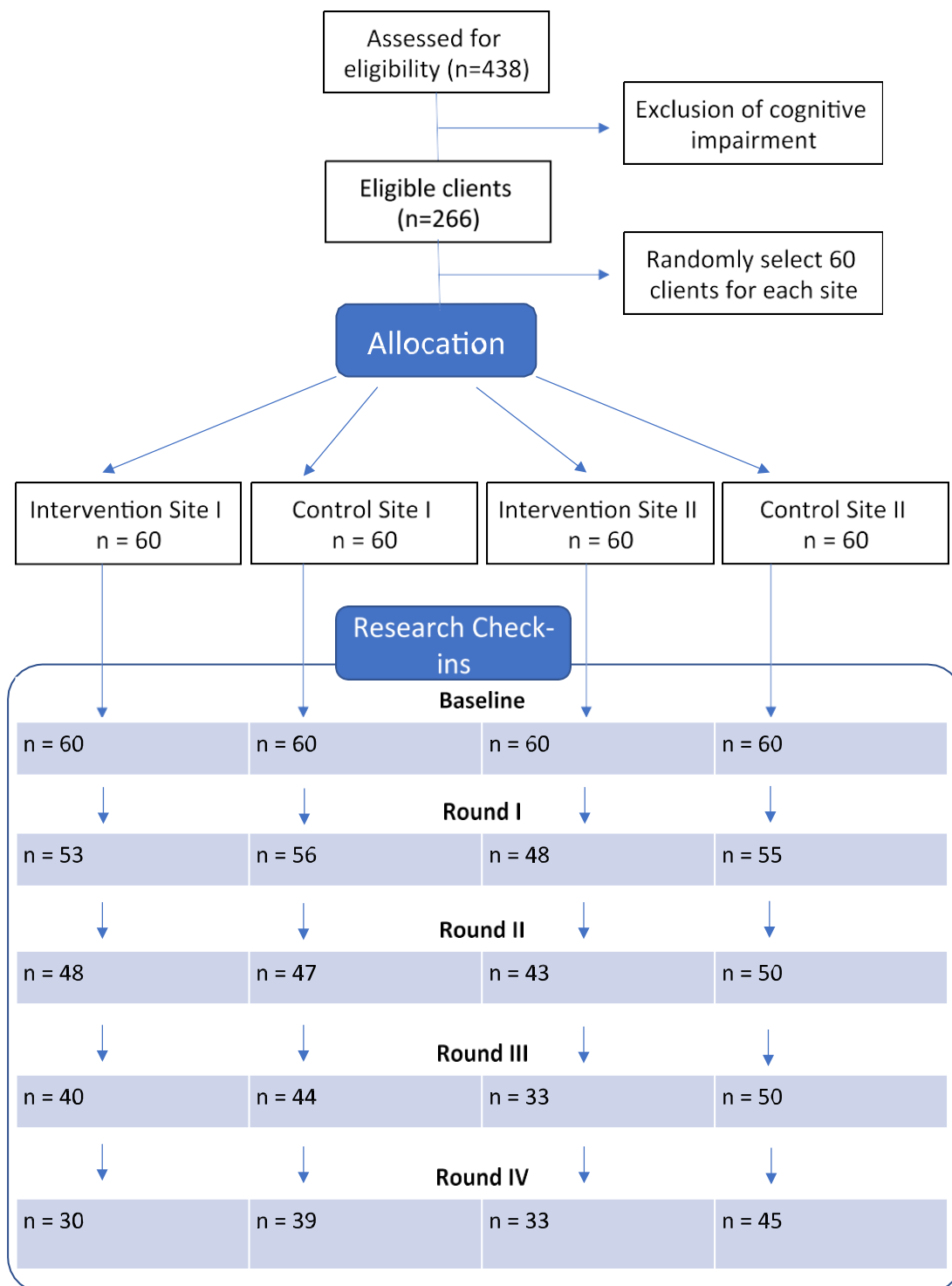
The current study utilized a quasi-experimental cluster design with groups of clients randomized to intervention versus treatment as usual condition based on site. Urban sites were randomized to intervention versus control condition based on a random coin flip; the same procedure was used to determine rural intervention versus control conditions.

### **Study Cohort Assembly**

Two CMH intervention sites (1 rural, 1 urban) and 2 control sites (1 rural, 1 urban) were included in the study based on prior collaborations with research investigators. Each urban and rural pair of intervention and control sites was chosen for comparability between the intervention and control sites, in clinical diagnosis, locale, and age of population served. Providers and clients were eligible for participation based on their location; all providers in the intervention sites participated in the intervention condition, and all providers in the control sites participated in the control condition.

Clients across all 4 clinical sites (N = 438) were assessed for eligibility to participate in the study. At the study's onset, providers at the sites assisted researchers in determining their clients' eligibility to participate by examining each client in their caseload based on the criteria listed in the Participants section below. Further exclusion for inability to provide informed consent (for example, because of severe dementia), language barriers, and substance abuse as the primary mental health issue narrowed the pool to 266. Clients were then randomly selected from the available pool by systematic selection, every 10th person, from an alphabetically ordered list in an iterative looped process. Clinicians approached their clients for initial interest in study participation, and then clients discussed informed consent with the research team; they were officially enrolled in the study upon completion of informed consent. At the time point of baseline data collection, 60 client participants were recruited from each of the 4 clinical sites (see Figure 1 for CONSORT diagram).

**Figure 1. CONSORT Diagram: Participant Enrollment and Retention**



### Participants

A convenience sample of clients were recruited from the existing clientele of 4 CMH



treatment facilities (2 in California urban settings and 2 in New Mexico rural settings).

Participants had to be over the age of 18, participating in CMH services for a serious mental health need, able to provide informed consent, and proficient in one of the languages in which the intervention was offered (English, Spanish, and Chinese). Clients with a primary diagnosis of a substance use disorder were excluded from participation.

In total, participants included 240 individuals (60 in each rural or urban intervention or control site) with an overall mean age of 58.14 (SD = 14.9). Approximately half the participants were female and half male (46.7% male, 52.9% female, 0.4% transgender), and racial/ethnic background included 54.9% white, 25.7% Hispanic, 8.9% Asian or Pacific Islander, 6.8% black, 0.8% American Indian or Alaskan Native, 0.4% mixed race, and 2.5% other or unknown.

Levels of between-subject location and treatment factors differed significantly across demographic variables (see Tables 1 and 2), as well as 5 of the 7 treatment outcome variables at the baseline assessment (see Table 3). By design, the urban sites were geriatric clinics whose participants were of average older age than the adult clinic rural sites. The intervention sites were also more racially and ethnically diverse than the cosites, with a high proportion of Asian/Pacific Islander clients in the urban intervention site (a Chinese-population-serving site) and a high proportion of Hispanic clients in the rural intervention site. There were also significant differences in employment status and partner status across the sites, driven by higher proportions of part- or full-time employment and married or living-with-partner status at the rural control site.

Table 1.: Participant Demographics

		Rural	Urban	Rural			
	Overall	Urban Control	Control	Intervention	Intervention	<i>F</i> or $\chi^2$	$\eta^2$ or $\phi$
<i>Age</i> – M (SD)	58.14 (14.9)	67.58 (5.45)	47.48 (13.14)	70.11 (6.89)	46.69 (13.99)	88.40 <sup>c</sup>	0.53
<i>Gender</i> <sup>a</sup> (%)						2.08	0.09
Male	112 (46.7)	29 (48.3)	25 (41.7)	26 (43.3)	32 (53.3)		
Female	127 (52.9)	30 (50.0)	35 (58.3)	34 (56.7)	28 (46.7)		
Transgender	1 (0.4)	1 (1.7)	0	0	0		
<i>Race</i> <sup>b</sup> (%)						89.07 <sup>c</sup>	0.63
White	130 (54.9)	38 (63.3)	37 (64.9)	30 (50.0)	25 (41.7)		
Black	16 (6.8)	10 (16.7)	0	6 (10.0)	0		
Hispanic	61 (25.7)	4 (6.7)	20 (35.1)	5 (8.3)	32 (53.3)		
Asian or Pacific Islander	21 (8.9)	5 (8.3)	0	16 (26.7)	0		
American Indian or Alaskan Native	2 (0.8)	1 (1.7)	0	0	1 (1.7)		
Mixed	1 (0.4)	1 (1.7)	0	0	0		
Other	5 (2.1)	1 (1.7)	0	3 (5.0)	1 (1.7)		
Unknown	1 (0.4)	0	0	0	1 (1.7)		

Note. \*\*  $p < .01$ . a  $df = 3$ ., Transgender category was excluded from the  $\chi^2$  -test owing due to low expected cell counts.

b  $df = 9$ ., Categories “American Indian or Alaskan Native’,” “Mixed’,” “Other’,” and “Unknown” were excluded from the  $\chi^2$  -test due owing to low expected cell counts, 5 individuals were missing on this variable.

Note. \*\*  $c p < .01$ .

Table 2.: Participant Demographics, Continued

			Rural	Urban	Rural		
	Overall	Urban Control				$\chi^2$	$\phi$
			Control	Intervention	Intervention		
<i>Employment status<sup>a</sup></i>						100.40 <sup>c</sup>	0.66
Full time	3 (1.3)	0	3 (5.5)	0	0		
Part time	21 (8.9)	0	21 (38.2)	0	0		
No employment	121 (51.5)	33 (55.0)	15 (27.3)	41 (68.3)	32 (53.4)		
Other	20 (8.5)	9 (15.0)	0	9 (15.0)	2 (3.3)		
Unknown							
<i>Marital status<sup>b</sup> (%)</i>	70 (29.8)	18 (30.0)	16 (29.1)	10 (16.7)	26 (43.3)	62.82 <sup>c</sup>	0.54
Never married	74 (31.2)	16 (26.7)	12 (20.7)	9 (15.3)	37 (61.7)		
Married	26 (11.1)	1 (1.7)	14 (24.1)	9 (15.3)	2 (3.3)		
Divorced	52 (21.9)	13 (21.7)	10 (17.2)	13 (22.0)	16 (26.7)		
Widowed	13 (5.5)	3 (5.0)	1 (1.7)	7 (11.9)	2 (3.3)		
Separated	5 (2.1)	1 (1.7)	1 (1.7)	2 (3.4)	1 (1.7)		
Living with partner	7 (3.0)	0	7 (12.1)	0	0		
Unknown	60 (25.3)	26 (43.3)	13 (22.4)	19 (32.2)	2 (3.3)		

Note. \*\*  $p < .01$ . a  $df = 9$ ,. “Full Time” category was excluded from the  $\chi^2$ - test owingdue to low expected cell counts,; 5 individuals were missing on this variable.

b  $df = 9$ ,. Categories “Widowed’,” “Separated’,” and “Living wwith partner” were excluded from the  $\chi^2$  -test owingdue to low expected cell counts.

Note. \*\* c  $p < .01$ .

Table 3.: Observed Sample Statistics, Key Study Outcomes

		Baseline	6 Months	12 Months	18 Months	24 Months
<i>Decision Satisfaction</i>	Urban control	4.02 (0.71)	4.15 (0.64)	4.31 (0.52)	4.19 (0.62)	4.09 (0.53)
	Rural control	4.47 (0.58)	4.39 (0.54)	4.19 (0.66)	4.30 (0.57)	5.24 (0.66)
	Urban interv.	4.28 (0.53)	4.27 (0.59)	4.21 (0.66)	4.21 (0.59)	3.95 (0.48)
	Rural interv.	4.36 (0.56)	4.26 (0.53)	4.35 (0.53)	4.43 (0.61)	4.14 (0.77)
<i>Communication Satisfaction</i>	Urban control	1.99 (0.87)	2.00 (0.99)	1.72 (0.60)	1.82 (0.76)	2.01 (0.67)
	Rural control	1.81 (0.56)	1.71 (0.55)	1.75 (0.68)	1.71 (0.75)	1.69 (0.65)
	Urban interv.	1.88 (0.82)	1.69 (0.65)	1.81 (0.98)	1.66 (0.53)	2.08 (0.75)
	Rural interv.	1.58 (0.62)	1.73 (0.74)	1.77 (0.51)	1.70 (0.90)	1.91 (0.91)
<i>Therapeutic Support: Working</i>	Urban control	5.49 (1.09)	5.77 (1.25)	5.89 (0.93)	5.77 (0.90)	5.81 (1.34)
	Rural control	6.06 (1.05)	6.24 (0.67)	6.10 (0.92)	5.95 (0.83)	5.75 (1.04)
	Urban interv.	5.90 (1.07)	6.05 (0.95)	5.85 (1.37)	5.80 (1.14)	5.84 (0.94)
	Rural interv.	6.20 (0.75)	6.01 (0.94)	6.04 (0.86)	6.00 (0.87)	5.72 (1.18)
<i>Treatment Understanding</i>	Urban control	4.01 (1.29)	4.64 (0.99)	4.80 (0.88)	4.54 (0.86)	4.36 (1.00)
	Rural control	5.22 (0.67)	5.08 (0.69)	5.32 (0.88)	5.39 (0.45)	5.24 (0.66)
	Urban interv.	4.70 (1.29)	4.94 (1.06)	4.93 (1.14)	5.09 (0.94)	4.51 (0.87)
	Rural interv.	5.00 (0.91)	5.13 (0.65)	5.38 (0.59)	5.61 (0.42)	5.27 (0.83)
<i>Treatment Progress / Quality of Life</i>	Urban control	49.00 (30.00)	49.92 (30.43)	59.60 (27.33)	60.49 (27.73)	56.99 (28.74)
	Rural control	59.58 (24.17)	57.89 (25.22)	55.05 (23.83)	56.64 (25.25)	61.43 (21.69)
	Urban interv.	58.08 (24.19)	59.65 (26.97)	60.53 (27.85)	63.08 (23.00)	54.08 (29.63)
	Rural interv.	57.52 (23.98)	55.94 (22.62)	49.81 (26.46)	53.63 (25.41)	47.08 (29.46)
<i>Mental</i>	Urban control	38.65 (13.62)	39.91 (12.21)	39.00 (12.73)	41.91 (13.53)	39.57 (13.71)
	Rural control	39.97 (13.03)	39.32 (12.85)	39.89 (12.32)	38.80 (12.83)	37.77 (11.09)
	Urban interv.	43.83 (14.15)	43.94 (13.59)	42.53 (14.12)	46.05 (13.22)	39.93 (12.79)
	Rural interv.	34.15 (12.29)	35.76 (12.54)	34.55 (13.72)	34.68 (13.18)	35.85 (11.91)
<i>Physical</i>	Urban control	38.60 (10.59)	37.82 (12.43)	34.53 (10.93)	36.24 (12.24)	35.88 (12.34)
	Rural control	37.11 (10.15)	36.74 (12.72)	37.30 (12.43)	38.21 (11.44)	37.16 (12.56)
	Urban interv.	38.17 (11.07)	35.28 (12.20)	34.00 (10.75)	34.05 (8.94)	34.39 (8.80)
	Rural interv.	37.19 (12.59)	36.77 (9.80)	37.51 (12.34)	35.73 (10.73)	36.35 (9.73)

## **Interventions and Comparators or Controls**

The mPOWR intervention was given to all study participants at the rural and urban site chosen for the mPOWR intervention conditions because it incorporates the tools, communication strategies, prompts, and decision aides that allow for SDM in community mental health settings. Components of the mPOWR intervention included 2 main components: community-adapted quality of life and community living skill measures combined with 6 decision aids. Decision aids span 6 key life-functioning domains: (1) environment and activities, (2) personal care and daily life skills, (3) social relationships, (4) vocational skills, (5) physical health, and (6) psychological health and recovery. These decision aids are information tools that are used as part of the mPOWR shared decision-making toolkit designed to help guide consumers through the decision-making process. mPOWR was delivered to clients by their mental health providers, who were trained and supervised to utilize mPOWR through a series of online video training modules, 12 hours of on-site experiential training for each clinical site, ongoing on-site supervision, and accessible phone consultation with the trainer. Data regarding comprehension, adoption, and fidelity of providers and clients to mPOWR were not collected and constituted a major study limitation (see Study Limitations section for a discussion of this issue).

All clients worked with identified clinical staff at their mental health clinics. Each staff provider was responsible for up to a dozen study participants as well as clients who were not study participants. When providers left the practice, their caseload was transferred to a new provider directly or via an interim covering provider. Treatment as usual within community mental health was chosen as the comparator for the urban and rural site chosen as control sites, to compare mPOWR to usual care provided in public mental health settings.

Study-related procedures were broadly organized into 2 phases. Phase I included preparing and training providers utilizing the mPOWR formal training protocol, hiring the full complement of research support staff, submitting the study to IRB for approval, final advising by the Clinical and Research Advisory Boards, and completing the informed consent process and client enrollment. Phase II spanned 24 months, the duration of the mPOWR treatment intervention. Research questionnaires were administered before the intervention was initiated

(baseline = T0, June 2014) and repeated at 6-month intervals (T1-T4), consistent with the effectiveness study protocol. Each 6-month time interval comprised 1 wave of the study, yielding 4 total study waves of research questionnaire administration (approximate dates: T1 = December 2014, T2 = June 2015, T3 = December 2015, T4 = June 2016). Use or content of the care received by client participants was not measured; this limitation is addressed in the Discussion section.

### **Study Outcomes**

The current study collected demographic information related to gender, race/ethnicity, employment status, and marital status. Participants also reported on the following primary and secondary treatment outcomes assessed over the course of the study.

#### **Primary study outcomes**

*Treatment engagement and participation in shared decision making: Decision satisfaction.* The Satisfaction With Decision scale included 6 questions to measure a client's sense of having made a reasonable decision, with the advantage of simplicity and lack of specificity regarding the type of decision.<sup>41</sup> The original version of the Satisfaction With Decision scale was developed to specifically address decisions regarding depression treatment. A modified 5-item version was used in the current study to ensure its applicability to all treatment decisions. Five items were assessed on a 5-point scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) and included examples such as "I have as much input as I want in developing ways to address my situation(s)" and "I am satisfied with the decisions we are making about my situation." Previous research has found a Cronbach  $\alpha$  of .85 for the Satisfaction With Decision scale; in the current sample, internal consistency analyses indicated a Cronbach  $\alpha$  of .84 for the 5-item modified version.

*Treatment engagement and participation in shared decision making: Communication satisfaction.* Communication satisfaction was measured utilizing a modified version of a 19-item measure of communication patterns between physicians and their clients.<sup>42</sup> Thirteen items that focused on client satisfaction with their communication with their provider and their engagement in treatment were measured on a 7-point scale (strongly agree, agree, agree somewhat, undecided, disagree somewhat, disagree, strongly disagree). Example items

included “My provider checks to be sure that I understand everything” or “I am very engaged in my own treatment planning.” Campbell et al<sup>43</sup> found Cronbach  $\alpha$  values of .69 for the client version of the questionnaire, indicating good internal consistency. In the current study, the 13 communication satisfaction items had a Cronbach  $\alpha$  value of .89.

*Client treatment understanding via shared decision making.* A 6-item modified version of the Shared Decision Making Questionnaire (SDM-Q-9)<sup>43</sup> was utilized to assess client reports about the degree to which their provider involved them in understanding and making a treatment decision.

Examples items included “My provider discussed the advantages and disadvantages of options and strategies” or “My provider and I prioritized action steps/reached an agreement on how to proceed” measured on a 6-point scale (completely disagree, strongly disagree, somewhat disagree, somewhat agree, strongly agree, completely agree). Previous research indicated Cronbach  $\alpha$  of .94, and the current study also showed that SDM-Q-9 items had a Cronbach  $\alpha$  of .94.

*Perceived therapeutic support: Working alliance.* The Working Alliance Inventory measures the perception of therapeutic alliance in a clinical dyad during the process of developing a relationship required for effective psychotherapy.<sup>44,45</sup> The current study utilized the client version of the Working Alliance Inventory, which has previously shown Cronbach  $\alpha$  values of .93, and included 7 items measured on a 7-point scale (never, rarely, occasionally, sometimes, often, very often, always). Example items included “I am confident in my provider’s ability to help me” and “My provider and I trust one another.” The current study showed a Cronbach  $\alpha$  value of .85 for the Working Alliance Inventory items.

### **Secondary study outcomes**

*Treatment progress and general quality of life.* The Outcome Rating Scale (ORS) was utilized as a repeated global measure of therapy outcomes and quality of life changes during the course of therapy.<sup>46</sup> A visual analog scale (a horizontal line on which the participants mark how well they are doing within the last week relative to the low end and high end of the scale) records 4 questions about general well-being, personal well-being, close relationships, and work/school/friend relationships. Research team members measured with a ruler the physical

marks for each of 4 domains on the visual analog scale and converted to a score from 1 to 100. The 4 items were then averaged for an overall therapy outcome score. ORS items in the current sample indicated a Cronbach  $\alpha$  of .71.

*Client functionality: Mental and physical health.* The SF-12 (Health Survey Short Form-12) was utilized to assess physical and mental aspects of health and sense of well-being.<sup>47</sup> The SF-12 consists of 12 questions about overall health, limitations from health conditions, physical health, emotional well-being and daily activities, and feelings over the past 4 weeks. The physical health and mental health subscales of the SF-12 were utilized as key client functioning outcomes in the current study. The SF-12 is valid for use with clients with chronic mental illness and has been applied in many countries (and languages), across multiple physical and mental conditions, and with adults of all ages.<sup>48</sup>

### **Study Setting**

The study took place in 4 CMH treatment facilities (2 in California urban settings and 2 in New Mexico rural settings), characterized by their long-standing commitment to serving people with chronic serious mental illness (psychotic disorders, bipolar disorders, or severe depressive disorders). Study settings were chosen for their representation of a community mental health setting within rural versus urban areas.

### **Data collection and sources**

Participants were asked to respond to the research questionnaires at designated intervals throughout the 3-year study. Informed consent was obtained from all clients and providers before the research and participation in the mPOWR intervention began. To mitigate bias in the data collection the clinical services providers offered were germane to the clients' treatment and welfare but were not temporally linked to their completion of the research packets. Therefore, regardless of whether clients met with their providers, they were asked to complete the research outcome questionnaires at the planned intervals. Client research packets were administered 5 times—the first at the start of mPOWR implementation, and then every 6 months for 4 more administrations. Chart reviews were conducted at each of these time points to identify changes in psychiatric condition, diagnosis, or psychotropic medications; concomitant medical conditions; and major changes in client status (such as protracted



hospitalization, relocation, or death).

The research team implemented measures to minimize participant attrition and missing data. First, researcher team members made every effort to engage existing clients and providers by regular phone contact between waves of data collection. Clients provided working phone numbers, but sometimes these became inoperative; in those instances, research team members either met clients at the clinic on a day they were scheduled to be there or arranged home visits through staff and community liaisons. Interview times were arranged to suit clients' schedules or preferences. Second, the team administered outcome questionnaires verbally when appropriate, to assist in comprehension and minimize missing data. Third, focused efforts to reduce attrition among Chinese-speaking participants were addressed by hiring a competent and personable translator to accompany the research team on all interviews. Fourth, reports and self-report items were integrated into electronic chart systems to flag due dates for research questionnaires and help clinicians track the participants' progress throughout the study. Finally, the training and research team met regularly with clinicians whose clients were enrolled in the study, to provide assistance and support.

### **Qualitative Exit Interviews**

Clients in the intervention groups were asked to participate in an individual exit interview with research assistants to obtain their feedback about their experiences with the mPOWR intervention, either at their time of study disengagement or at the end of the study. The interviewer asked 5 open-ended questions about how clients' involvement in treatment planning changed over the past 2 years, clients' overall response to and perceptions of the strengths and weaknesses of the mPOWR intervention, and feedback for improvement of mPOWR.

Research team members transcribed and then coded detailed notes about interview responses, utilizing methods of thematic analysis.<sup>40,41</sup> Thematic analysis is a well-established qualitative methodology that establishes patterns and themes from primary data. Two research team members coded the data using ATLAS.ti qualitative data analysis and research software. Consistent with thematic analysis processes, the researchers analyzed qualitative data for initial data codes, and then grouped the data into themes. Subsequently, they read the themes to

decide on definitions and names and searched the text to measure the frequency of each overarching theme.

### **Analytical and Statistical Approaches**

All study participants were assigned deidentified numbers for all data collection purposes. The lead research team investigator maintained the assignment file in an encrypted file. Data stored from all sources—research questionnaire databases and electronic medical records—were linked by a unique study number that facilitated the merging of data sources. A random spot-check data verification process ensured that data were merged accurately. This study was institutional review board-approved (covering all study sites) by the University of New Mexico. No harms attributable to the study occurred during the study.

The study was characterized by a 2 (Location)  $\times$  2 (Treatment)  $\times$  5 (Wave) mixed-factorial, hypothesis-driven design, with the first 2 factors varying across clinics. The primary study aims were addressed by modeling individual-level trajectories of therapeutic outcomes across the study waves as a function of location and treatment. As such, a series of latent growth curve models (LGCM)<sup>51,52</sup> was estimated using SAS PROC MIXED Version 9.4 (SAS Institute, 2014). Latent growth curve analysis has been identified as an ideal specification for studies that utilize a between  $\times$  within factorial design with more than 4 assessment intervals, and thus was used in this study to assess change over time on main study outcomes for intervention compared with control conditions.<sup>53-55</sup> Examination of means over the assessment intervals suggested that the typical trajectory for most groups on the primary and secondary study outcomes followed a quadratic function, which informed our initial model specification. Missing responses across waves were handled using full-information maximum likelihood estimation, which yields unbiased estimates of model parameters under the missing-at-random assumption.<sup>56</sup> Sensitivity analyses were also performed in which a cubic component (and corresponding moderation effects) for the primary (quadratic) LGC were examined, along with a traditional repeated Analysis of variance (ANOVA) approach.

*Model Equations.* This section explains model equations for LGCM analyses across all study outcomes. Preliminary analysis of group-specific means across waves led us to examine a model with quadratic growth functions and, consistent with the traditional multilevel modeling

specification of LGCMs, the level 1 (person) model may be expressed by the following equation:

$$(1) \quad Y_{jt} = \theta_{0j} + \theta_{1j} * Wave_t + \theta_{2j} * Wave \times Wave_t + e_{jt}$$

where  $Y_{jt}$  represents the outcome score for person  $j$  at *Wave*  $t$ ,  $\theta_{0j}$  is the regression intercept that varies randomly across persons, whereas  $\theta_{1j}$  and  $\theta_{2j}$  represent the linear and quadratic effect of measurement occasion, which also vary across persons, and  $e_{jt}$  is the level 1 residual describing the deviation of an individual's observed score from its predicted value at any given occasion. Given the equally spaced assessment intervals (6 months), the *Wave* $t$  variable was coded with integer values ranging from 0 to 4. Consistent with Raudenbush and Bryk's<sup>51</sup> slopes-as-outcomes formulation, each of the terms in the level 1 equation is expressed as its own level 2 equation:

$$(2) \quad \theta_{0j} = \gamma_{00} + \gamma_{01} * Location + \gamma_{02} * Treatment + \gamma_{03} * Location \times Treatment + u_{0j}$$

In the initial analyses, an effect coding scheme was applied to the *Location* (Urban = +0.5; Rural = -0.5) and *Treatment* (Intervention = +0.5; Control = -0.5) factors, which leads to a straightforward interpretation of the fixed intercept ( $\gamma_{00}$ ) coefficient, which represents the average outcome score at baseline, across all participants and conditions. Additionally,  $\gamma_{01}$  and  $\gamma_{02}$  coefficients represent differences in average outcome scores at baseline as a function of clinic location and treatment, respectively. Finally, the  $u_{0j}$  term reflects unexplained variability in baselines scores across participants. Turning to the remaining level 2 equations:

$$(3) \quad \theta_{1j} = \gamma_{10} + \gamma_{11} * Location + \gamma_{12} * Treatment + \gamma_{13} * Location \times Treatment + u_{1j}$$

$$(4) \quad \theta_{2j} = \gamma_{20} + \gamma_{21} * Location + \gamma_{22} * Treatment + \gamma_{23} * Location \times Treatment + u_{2j}$$

$\gamma_{10}$ ,  $\gamma_{20}$  represent the fixed, or average, linear and quadratic components of the growth trajectories, and the remaining  $\gamma$  parameters reflect the cross-level interaction effects of location and treatment, which describe how the linear and quadratic components of the growth function vary as across these factors. For example, the  $\gamma_{11}$  coefficient describes differences in the linear trajectories of participants across urban and rural sites, whereas  $\gamma_{12}$  reflects differences in the linear component of trajectories across sites that implement a treatment versus control protocol. Finally, the  $\gamma_{13}$  term represents the clinic-specific effect of location and treatment. The  $\gamma_{20}$ - $\gamma_{23}$  coefficients describe the same cross-level interaction effects, but for the quadratic component of the growth function. Finally, the  $u_{1j}$  and  $u_{2j}$  terms capture unexplained

heterogeneity in the linear and quadratic growth processes, and these G-side random effects (along with the random intercept) were modeled with an unstructured covariance matrix. Substituting the level 2 terms into the level 1 equation yields a combined equation that was submitted to PROC MIXED.

Because age differences were so heavily confounded with the location condition (urban or rural), and racial/ethnic differences with specific intervention sites in the treatment condition, controlling for age and race/ethnicity was not possible within the study's Location  $\times$  Treatment  $\times$  Wave factorial design. Instead, differences in outcomes by age may be inferred by examining location effects.

Coding of Time. A proper understanding of the coding scheme used to capture the nonlinear growth function is essential to correctly interpret the results provided below. For the linear vector (ie, *Wave*), the baseline assessment was coded 0, with subsequent (equally spaced) follow-up assessments assigned sequential integer values (ie, 6-month = 1, 12-month = 2, 18-month = 3, 24-month = 4), and the quadratic vector (ie, *Wave*  $\times$  *Wave*) is comprised of the squared linear values (ie, 6-month = 1, 12-month = 4, 18-month = 9, 24-month = 16). As a result, the coefficient for the linear component ( $\gamma_{10}$ ) represents the conditional (instantaneous) linear slope at *Wave* = 0, whereas the coefficient for the quadratic component ( $\gamma_{20}$ ) reflects the change in the linear slope over across-assessment intervals, such that each unit of increase in *Wave* is associated with a  $\gamma_{20}$ -units change in the *linear* coefficient ( $\gamma_{10}$ ). For example, a linear coefficient of  $\gamma_{01} = 0.2$  with a quadratic coefficient  $\gamma_{20} = -0.1$  implies a growth function that slopes upward at baseline but begins to diminish at the 6-month follow-up ( $\gamma_{10} = 0.2 - 0.1 = 0.1$ ), becomes flat by the 12-month follow-up ( $\gamma_{10} = 0.2 - 0.2 = 0$ ), and begins to turn downward at the 18-month ( $\gamma_{10} = 0.2 - 0.3 = -0.1$ ) and 24-month ( $\gamma_{10} = 0.2 - 0.4 = -0.2$ ) follow-ups.

This coding scheme also leads to a straightforward interpretation of the regression intercept ( $\gamma_{00}$ ) as the expected value of the outcome at baseline. The effect-coding scheme applied to the *Location* (Rural = -0.5; Urban = 0.5) and *Treatment* (Control = -0.5; Intervention = 0.5) factors means that the coefficients associated with the first-order effects of these terms describe cross-site differences in the intercept (baseline), whereas coefficients for the

interaction terms reflect between-site differences in the corresponding linear or quadratic component of the growth function. Finally, to aid in interpreting cross-site differences in outcome trajectories, group-specific growth functions were plotted for each outcome variable (Figures 2-7) using the ggplot2 library<sup>57</sup> in R.<sup>58</sup> Parameter estimates for study outcomes are provided in Tables 4 and 5.

Table 4. LGCM Coefficients for Treatment Engagement and Participation in Shared Decision Making via Decision Satisfaction and Communication Satisfaction, Perceived Therapeutic Support via Working Alliance, and Treatment Understanding<sup>a</sup>

	Decision Satisfaction	Communication Satisfaction	Perceived Therapeutic Support: Working Alliance	Treatment Understanding
	Est. [95% CI]	Est. [95% CI]	Est. [95% CI]	Est. [95% CI]
$\gamma_{00}$ –Fixed Intercept	<b>4.26 [4.18, 4.34]</b>	<b>1.82 [1.73, 1.91]</b>	<b>5.93 [5.81, 6.05]</b>	<b>4.68 [4.53, 4.84]</b>
$\gamma_{01}$ –Location	<b>–0.28 [–0.44, –0.12]</b>	<b>0.25 [0.07, 0.43]</b>	<b>–0.40 [–0.65, –0.16]</b>	<b>–0.67 [–0.98, –0.36]</b>
$\gamma_{02}$ –Treatment	0.06 [–0.10, 0.21]	–0.17 [–0.35, 0.01]	<b>0.26 [0.01, 0.50]</b>	0.17 [–0.14, 0.48]
$\gamma_{03}$ –Locat. × Cond.	<b>0.39 [0.07, 0.70]</b>	0.03 [–0.33, 0.40]	0.33 [–0.17, 0.83]	<b>0.81 [0.19, 1.43]</b>
$\gamma_{10}$ –Fixed Wave	0.06 [–0.01, 0.14]	–0.09 [–0.19, 0.00]	0.10 [–0.04, 0.24]	<b>0.38 [0.23, 0.52]</b>
$\gamma_{11}$ –Wave × Locat.	0.15 [–0.00, 0.30]	<b>–0.21 [–0.40, –0.02]</b>	0.09 [–0.20, 0.37]	<b>0.31 [0.03, 0.60]</b>
$\gamma_{12}$ –Wave × Cond.	–0.02 [–0.17, 0.13]	0.05 [–0.14, 0.24]	–0.26 [–0.54, 0.03]	0.05 [–0.24, 0.34]
$\gamma_{13}$ –Wave × Locat. × Cond.	<b>–0.32 [–0.62, –0.01]</b>	–0.18 [–0.56, 0.21]	0.00 [–0.57, 0.57]	–0.44 [–1.02, 0.14]
$\gamma_{20}$ –Fixed Wave × Wave	<b>–0.03 [–0.05, –0.01]</b>	<b>0.03 [0.01, 0.05]</b>	–0.04 [–0.07, 0.00]	<b>–0.08 [–0.12, –0.05]</b>
$\gamma_{21}$ –Wave × Wave × Locat.	–0.03 [–0.07, 0.01]	<b>0.05 [0.01, 0.10]</b>	–0.00 [–0.07, 0.07]	<b>–0.09 [–0.16, –0.02]</b>
$\gamma_{22}$ –Wave × Wave × Cond.	0.00 [–0.04, 0.04]	0.01 [–0.04, 0.05]	0.05 [–0.02, 0.13]	–0.01 [–0.08, 0.06]
$\gamma_{23}$ –Wave × Wave × Locat. × Cond.	0.05 [–0.02, 0.12]	0.03 [–0.06, 0.12]	–0.01 [–0.17, 0.13]	0.08 [–0.06, 0.22]
$\tau^2_{00}$ –Random Intercept	<b>0.18</b>	<b>0.24</b>	<b>0.54</b>	<b>0.68</b>
$\tau^2_{11}$ –Random Wave	0.04	0.09	<b>0.46</b>	0.15
$\tau^2_{22}$ –Random Wave×Wave	0.00	0.00	<b>0.03</b>	0.01
$\sigma^2$ –Level 1 Residual	<b>0.19</b>	<b>0.29</b>	<b>0.42</b>	<b>0.42</b>

Note. Coefficients in bold are significant a p < .05 level.

Table 5. LGCM Coefficients for Treatment Progress and General Quality of Life, and Client Functionality via Mental Health and Physical Health<sup>a</sup>

	Treatment Progress / Quality of Life	Mental Health	Physical Health
	Est. [95% CI]	Est. [95% CI]	Est. [95% CI]
$\gamma_{00}$ —Fixed Intercept	<b>55.62 [52.31, 58.93]</b>	<b>39.20 [37.48, 40.92]</b>	<b>37.69 [36.25, 39.13]</b>
$\gamma_{01}$ —Location	-6.33 [-12.95, 0.30]	<b>4.23 [0.79, 7.66]</b>	1.51 [-1.37, 4.39]
$\gamma_{02}$ —Treatment	3.12 [-3.50, 9.75]	-0.93 [-4.36, 2.50]	-0.65 [-3.53, 2.23]
$\gamma_{03}$ —Locat. × Cond.	10.93 [-2.32, 24.18]	<b>9.67 [2.80, 16.53]</b>	-1.69 [-7.45, 4.07]
$\gamma_{10}$ —Wave	1.77 [-1.24, 4.79]	0.48 [-0.93, 1.88]	-0.96 [-2.02, 0.09]
$\gamma_{11}$ —Wave × Locat.	<b>8.09 [2.06, 14.12]</b>	0.44 [-2.37, 3.25]	<b>-2.49 [-4.60, -0.38]</b>
$\gamma_{12}$ —Wave × Cond.	0.88 [-5.14, 6.91]	0.88 [-1.93, 3.69]	-0.06 [-2.17, 2.05]
$\gamma_{13}$ —Wave × Locat. × Cond.	-2.86 [-14.92, 9.19]	-0.60 [-6.22, 5.02]	0.41 [-3.82, 4.64]
$\gamma_{20}$ —Wave × Wave	-0.40 [-1.16, 0.36]	-0.12 [-0.47, 0.23]	0.13 [-0.14, 0.40]
$\gamma_{21}$ —Wave × Wave × Locat.	<b>-1.59 [-3.11, -0.07]</b>	-0.12 [-0.82, 0.58]	0.46 [-0.08, 1.00]
$\gamma_{22}$ —Wave × Wave × Cond.	-0.77 [-2.29, 0.75]	-0.15 [-0.85, 0.55]	-0.05 [-0.59, 0.49]
$\gamma_{23}$ —Wave × Wave ×			
$\tau_{00}$ —Random Intercept	<b>409.34</b>	<b>109.89</b>	<b>86.38</b>
$\tau_{11}$ —Random Wave	84.10	3.17	-- <sup>b</sup>
$\tau_{22}$ —Random Wave ×	<b>5.63</b>	0.19	0.16
$\sigma^2$ —Level 1 Residual	<b>287.58</b>	<b>67.21</b>	<b>38.66</b>

<sup>a</sup> Coefficients in bold are significant at a  $p < .05$  level.

<sup>b</sup> The variance component associated with this parameter was not estimable for this variable.

### Changes to the original study protocol

No major changes occurred from the original proposal to the study protocol. An institutional review board approved this research.

## Results

### Participant Flow

Out of 438 clients assessed for eligibility, 266 were deemed eligible and 240 were enrolled in the study (60 clients per study site, over 4 urban and rural intervention and control sites). Despite retention efforts, over the course of the study, considerable client dropout occurred, likely due to forces such as the populations served (complex psychosocial and serious mental health needs), organizational systemic complications (staff and leadership turnover, competing provider demands, fiscal crises by the organization), cognitive decline of the clients over time (particularly the older adult clients in the urban setting), and client discharge when clinical services were no longer indicated. By the end of the study (24 months), 30 of the 60 clients from the urban intervention site, 39 of the 60 clients from the urban control site, 33 of the 60 clients from the rural intervention site, and 45 of the 60 clients from the rural control site remained in the study (refer to Figure 1 for details). These figures represent 50% dropout for the urban intervention site, 35% dropout for the urban control site, 45% dropout for the rural intervention site, and 25% dropout for the rural control site.

Specific reasons for attrition or dropout included the following, listed in order of most to least common: (1) case was closed administratively (43%), which included unexplained and voluntary dropouts from treatment and those who felt that needs had been met or felt able to discontinue or take a break from services; (2) client moved out of the service area (10%); (3) client died, for reasons unrelated to the study intervention (9%); (4) client experienced progressive cognitive decline (8%); (5) client was unresponsive to efforts at contact despite multiple attempts (6%); (6) client was too sick to continue (3%); (7) client's long-term hospitalization or assisted living placement made study participation difficult (3%); (8) client declined to continue participation (3%); and (9) unknown reason (15%).

### Descriptive Statistics

Observed means and standard deviations across the 4 groups in the 2 (Urban | Rural) × 2 (Control | Intervention) over the 5 assessment points are provided in Table 3. cursory examination of means at the baseline assessment suggests nontrivial between-group differences across all groups. However, the latent growth curve analysis provided in the follow



section provides a formal evaluation of these differences, along with a test for differences in outcome trajectories as a function of both location and treatment.

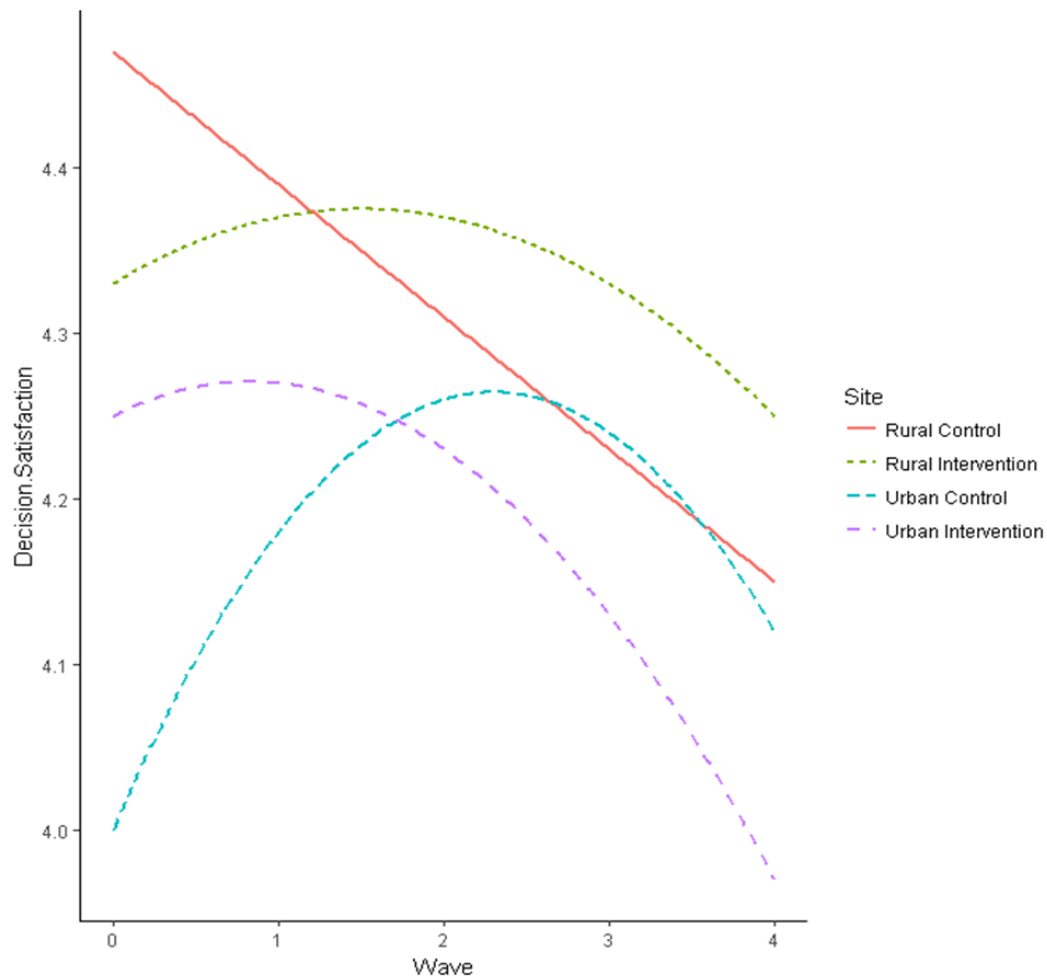
### **Results for Primary Study Aims**

#### **Primary Aim 1: Improve client and provider participation in shared decision making and engagement in mental health treatment.**

Overall, results did not indicate a significant first-order treatment effect or difference between the intervention versus control sites, on the primary study outcomes of decision satisfaction or communication satisfaction. Clients in the intervention conditions exhibited modest initial gains in decision satisfaction, although all conditions showed decreases in the outcome during the final 18 months of the study. Individuals in both intervention sites exhibited an initial decline in communication satisfaction, but scores began to increase over the final 3 waves.

*Treatment engagement and participation in shared decision making: Decision satisfaction.* Model-implied trajectories of decision satisfaction for each site are provided in Figure 2. First-order treatment effects were not significant. Participants at the rural control site reported the highest initial decision satisfaction scores but exhibited a consistent linear decline over the course of the study. In contrast, participants in the urban control condition were lowest in decision satisfaction at baseline, exhibited strong gains over the first year of the study, but then declined sharply following wave 3.

**Figure 2:** Site-specific Growth Trajectories for Treatment Engagement and Participation in Shared Decision Making via Decision Satisfaction

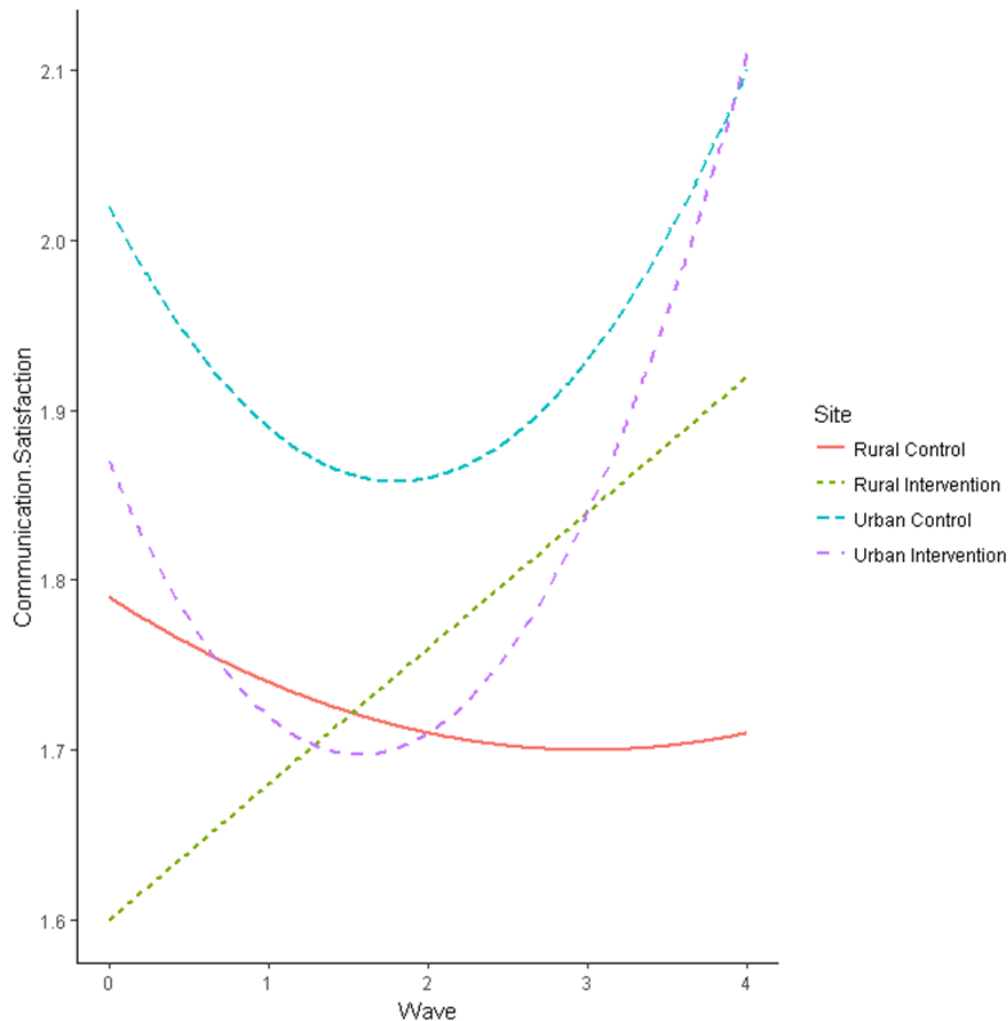


Finally, participants at the intervention clinics (urban and rural) reported comparable initial levels of decision outcome and exhibited similar pattern trajectories characterized by modest gains over the first assessment interval, followed by sharp declines following wave 2. The fixed intercept for treatment engagement and participation in shared decision making via decision satisfaction suggested an average score of  $\gamma_{00} = 4.26$  across groups at baseline; however, a first-order effect of Location ( $\gamma_{01} = -0.28$ ,  $t[215] = -3.50$ ,  $p < .001$ ) emerged, further qualified by a significant Location  $\times$  Treatment interaction ( $\gamma_{03} = 0.39$ ,  $t[215] = 2.43$ ,  $p = .016$ ), indicating site-specific differences in initial levels of decision satisfaction. Analysis of simple slopes<sup>59</sup> revealed that this interaction was driven primarily by clients in the urban control site ( $\gamma_{00 - Urban + Control} = 4.00$ ), who reported significantly lower levels of decision satisfaction relative

to participants at the urban intervention ( $\gamma_{00 - Urban + Interv.} = 4.25$ ), rural control ( $\gamma_{00 - Rural + Control} = 4.47$ ), and rural intervention ( $\gamma_{00 - Rural + Interv.} = 4.33$ ) sites. Although the first-order (pooled) effect of wave failed to reach significance ( $\gamma_{10} = 0.06$ ,  $t[197] = 1.60$ ,  $p = .11$ ), a 3-way Wave  $\times$  Location  $\times$  Treatment interaction emerged ( $\gamma_{13} = -0.32$ ,  $t[197] = -2.04$ ,  $p = .04$ ), suggesting that the rural control site differed significantly from the others in its initial<sup>00</sup> linear trajectory of decision satisfaction scores across the early assessment waves. However, these conditional effects are further qualified by a significant Wave  $\times$  Wave interaction ( $\gamma_{20} = -0.03$ ,  $t[185] = -2.87$ ,  $p = .005$ ), which suggested that the positive-linear growth function observed across all groups became flatter (more negative) over the course of the study. Finally, a significant random intercept variance ( $\tau^2 = 0.18$ ,  $Z = 4.83$ ,  $p < .001$ ) reflects unexplained heterogeneity in client reports of decision satisfaction at baseline, although the variance components for the linear and quadratic trajectories failed to reach significance.

***Treatment engagement and participation in shared decision making: Communication satisfaction.*** Figure 3 provides model-implied trajectories of communication satisfaction for each site. First-order treatment effects were not significant. Participants in the rural sites reported higher initial levels of communication satisfaction, and those at the rural control site exhibited a gradual linear decline in scores over the initial assessment waves, which leveled off near the end of the trial. In contrast, participants in the rural intervention condition showed a linear increase (albeit nonsignificant,  $p = .45$ ) in satisfaction across all study waves. Participants at the urban location (regardless of treatment) showed rapid declines in satisfaction over the first wave but began to increase quickly over the final 3 assessments.

**Figure 3:** Site-specific Growth Trajectories for Treatment Engagement and Participation in Shared Decision Making via Communication Satisfaction



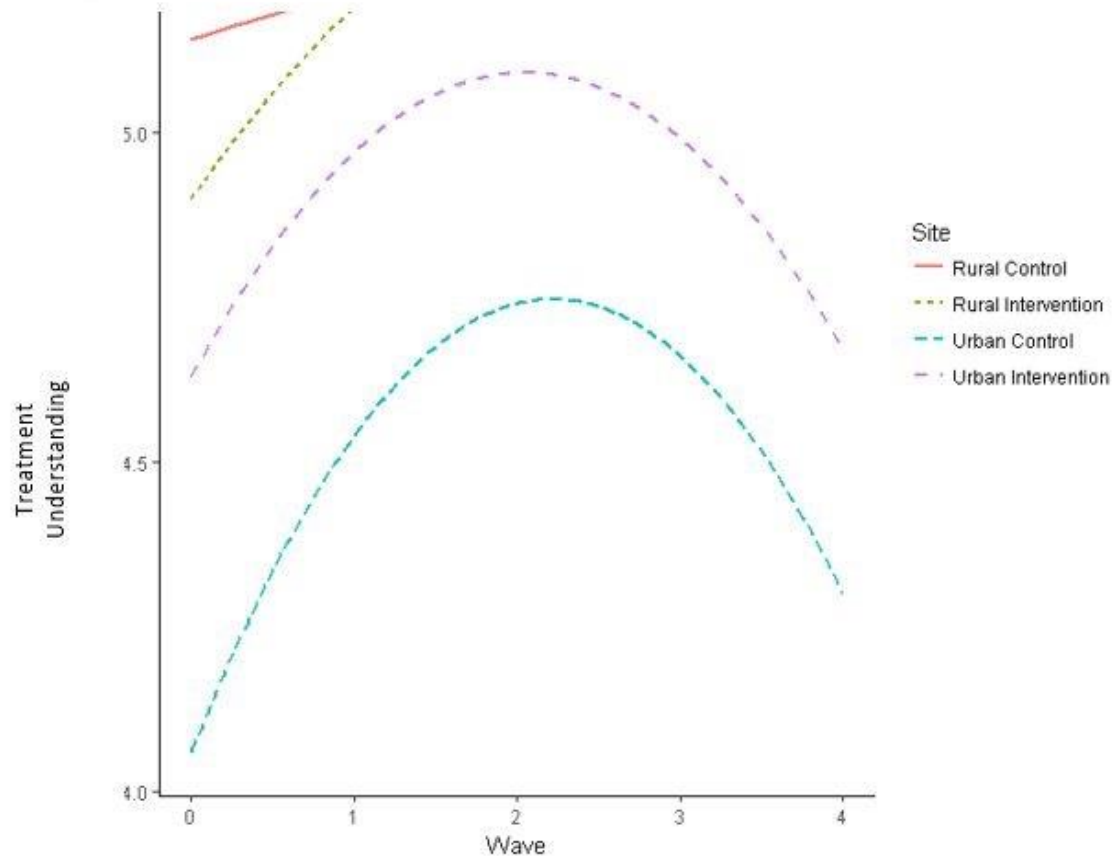
The fixed intercept for treatment engagement and participation in shared decision making via communication satisfaction suggested an average score of  $\gamma_{00} = 1.82$  across groups at baseline; however, a first-order effect of Location ( $\gamma_{01} = 0.25$ ,  $t[232] = 2.73$ ,  $p < .001$ ) emerged, indicating that participants who received treatment at urban clinics reported higher initial levels of overall satisfaction ( $\gamma_{00-Urban} = 1.95$ ), relative to those at the rural clinics ( $\gamma_{00-Rural} = 1.70$ ). Although the first-order effect of wave failed to reach significance ( $\gamma_{01} = -0.09$ ,  $t[192] = -1.93$ ,  $p = .06$ ), a 2-way Wave  $\times$  Location interaction emerged ( $\gamma_{11} = -0.21$ ,  $t[192] = -2.14$ ,  $p = .03$ ), suggesting that participants in urban and rural settings exhibited differences in

their linear trajectories of communication satisfaction scores across the early assessment waves. Moreover, a significant quadratic effect of wave emerged ( $\gamma_{20} = 0.03$ ,  $t[163] = 2.46$ ,  $p = .01$ ), which was further qualified by a significant Wave  $\times$  Wave  $\times$  Location interaction ( $\gamma_{21} = 0.05$ ,  $t[163] = 2.27$ ,  $p = .02$ ). Follow-up analyses revealed that participants in the urban intervention condition exhibited a significant linear decrease ( $\gamma_{10 - Urban + Interv.} = -0.22$ ,  $t[204] = -2.17$ ,  $p = .03$ ), and those in the urban control condition showed a marginally significant decline ( $\gamma_{10 - Urban + Control} = -0.18$ ,  $t[192] = -1.87$ ,  $p = .06$ ) in communication satisfaction early in the study, whereas participants at other sites showed no initial linear change (all  $p$ 's  $> .43$ ). However, the aforementioned quadratic effect and associated interaction suggest that the rate of increase in communication satisfaction became more pronounced over the course of the study, particularly among participants at the urban control site. As before, the significant variance component for the random intercept ( $\tau_{00}^2 = 0.24$ ,  $Z = 4.71$ ,  $p < .001$ ) is indicative of unexplained between-persons variability in initial communication satisfaction levels.

**Primary Aim 2: Increase client understanding of treatment and of treatment options.**

Client treatment understanding via shared decision making. Figure 4 illustrates the fitted curves for treatment understanding via SDM. No meaningful change in the primary study outcome of shared decision making was observed across treatment (intervention versus control) conditions. Clients in intervention sites did, however, show initial gains in shared decision making, which reversed by the final assessment point. Participants located in rural sites reported higher levels of SDM and exhibited small (statistically nonsignificant) gains over the course of the study. In contrast, urban sites started off lower in SDM, exhibited a significant initial increase in treatment understanding scores (all  $p$ 's  $< .05$ ), and then experienced a marked decline in scores over the final 2 assessment intervals.

**Figure 4.** Site-specific Growth Trajectories for Client Treatment Understanding via Shared Decision Making



The fixed intercept for client treatment understanding via shared decision making suggested an average score of  $\gamma_{00} = 4.68$  across groups at baseline. However, significant first-order effects of Location ( $\gamma_{01} = -0.67$ ,  $t[163] = -4.25$ ,  $p < .001$ ) and a significant Location  $\times$  Treatment interaction ( $\gamma_{03} = 0.81$ ,  $t[163] = 2.56$ ,  $p = .01$ ), suggested site-specific differences in initial levels of treatment understanding. Follow-up analyses revealed that this interaction was by driven clients in the urban control site ( $\gamma_{00 - Urban + Control} = 4.06$ ), who reported significantly lower levels of treatment understanding than participants at the urban intervention ( $\gamma_{00 - Urban + Interv.} = 4.63$ ), rural control ( $\gamma_{00 - Rural + Control} = 5.14$ ), and rural intervention ( $\gamma_{00 - Rural + Interv.} = 4.90$ ) sites. As expected, the first-order effect of wave was positive and significant ( $\gamma_{01} = 0.37$ ,  $t[160] = 5.12$ ,  $p < .001$ ); however, this effect was qualified as a 2-way Wave  $\times$  Location interaction ( $\gamma_{11} =$

0.31,  $t[160] = 2.15, p = .03$ ), suggesting that participants in urban settings exhibited stronger (more positive) trajectories of treatment understanding across the early assessment waves. Moreover, a significant quadratic effect of wave emerged ( $\gamma_{20} = -0.08, t[139] = -4.70, p < .001$ ), which was further qualified by a significant Wave  $\times$  Wave  $\times$  Location interaction ( $\gamma_{21} = -0.09, t[139] = -2.67, p = .009$ ). Follow-up analyses revealed that participants in the urban settings exhibited a decline in their rate of increase in treatment understanding ( $\gamma_{20 - Urban} = -0.13, t[149] = -4.98, p < .001$ ), whereas participants in rural settings did not ( $\gamma_{20 - Rural} = -0.04, t[127] = -4, p = .13$ ). As before, the significant variance component for the random intercept ( $\tau_{00}^2 = 0.68, Z = 5.05, p < .001$ ) is indicative of unexplained between-persons variability in initial treatment understanding levels.

**Primary Aim 3: Increase clients' sense of perceived support for their therapeutic outcomes.**

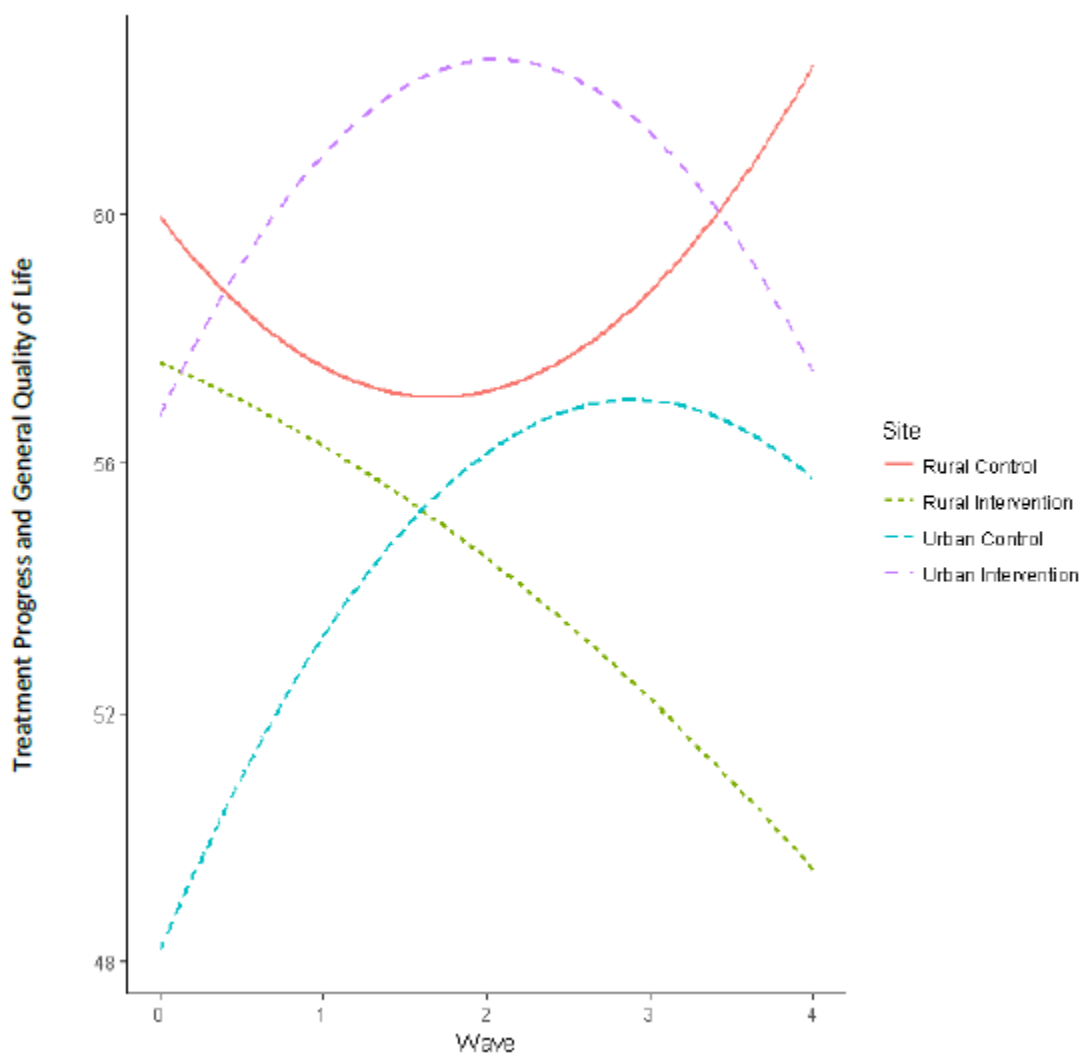
*Perceived therapeutic support: Working alliance.* Results indicated a significant treatment effect for working alliance, but in the opposite direction expected, with intervention sites showing less initial linear growth compared to control sites. Specifically, although clients in the control condition showed an initial increase in Working Alliance Inventory (WAI) scores, these gains reversed during the second half of the study. In contrast, participants in the intervention conditions showed declines in WAI throughout the study.

Turning to the conditional model trajectories illustrated in Figure 5, participants assigned to the control conditions exhibited an initial (nonsignificant) increase in working alliance scores, which began to decline after wave 2. In contrast, the initial trajectories for intervention participants were flat or slightly negative but grew more negative over the follow-up assessments. The fixed intercept for perceived therapeutic support via working alliance suggested an average score of  $\gamma_{00} = 5.93$  across groups at baseline, although first-order effects of location ( $\gamma_{01} = -0.40, t[230] = -3.20, p = .002$ ) and treatment ( $\gamma_{01} = 0.26, t[230] = 2.04, p = .04$ ) indicated cross-site differences in baseline scores. More specifically, participants in urban settings ( $\gamma_{00 - Urban} = 5.73$ ) and those assigned to control clinics ( $\gamma_{00 - Control} = 5.80$ ) reported lower levels, relative to those at the rural clinics ( $\gamma_{00 - Rural} = 6.13$ ) and those assigned to the intervention condition ( $\gamma_{00 - Interv.} = 6.06$ ). The pooled coefficient describing the linear effect of wave was small and positive, but not significant ( $\gamma_{10} = 0.10, t[183] = 1.36, p = .17$ ), suggesting

that participants showed virtually no growth in working alliance over the early assessment periods, and a marginally significant quadratic effect of Wave ( $\gamma_{20} = -0.04$ ,  $t[162] = -1.90$ ,  $p = .06$ ) indicated that the small linear effect may have begun to deteriorate during the second half of the study. None of the treatment or location interactions involving the Wave or Wave  $\times$  Wave terms emerged as significant. Finally, the variance components for the random intercept ( $\tau^2_{00} = 0.54$ ,  $Z = 5.85$ ,  $p < .001$ ), linear ( $\tau^2_{11} = 0.46$ ,  $Z = 3.60$ ,  $p < .001$ ) and quadratic ( $\tau^2_{22} = 0.03$ ,  $Z = 3.79$ ,  $p < .001$ ) effects of wave were significant, which indicated nontrivial heterogeneity between subjects in initial levels of working alliance as well as cross-person differences in trajectories.



**Figure 5.** Site-specific Growth Trajectories for Treatment Progress and General Quality of Life



### Secondary Study Aims

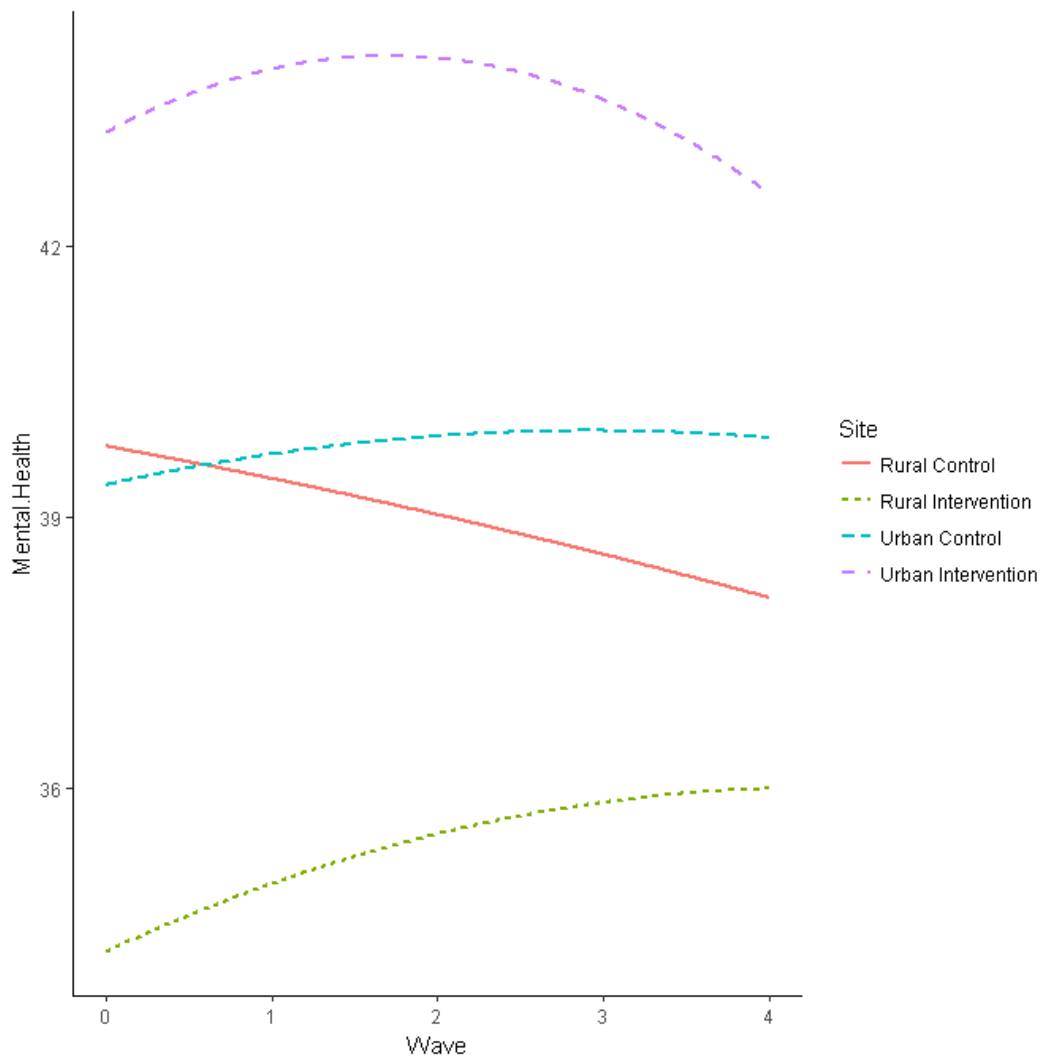
Overall, contrary to our predictions, results did not indicate a significant treatment effect or difference between the intervention versus control sites, on the secondary study outcomes of quality of life, mental health, and physical health. Trajectories of therapy outcomes (quality of life, physical health, and mental health) for clients at urban sites exhibited an initial increase followed by a decline, regardless of treatment condition, whereas clients in the rural intervention condition showed a consistent decline in outcomes. No meaningful change in mental health scores was observed across condition or location. Participants in the urban setting exhibited initial declines in physical health that leveled off during the final

assessment intervals, whereas those in the rural intervention site showed a gradual decline over the course of the study.

**Secondary Aim 1: Increase personal treatment progress and quality of life.**

Treatment progress and general quality of life (Outcome Rating Scale). First-order treatment effects for the secondary outcome of quality of life were not significant. According to the site-specific trajectories plotted in Figure 6, the urban clinics exhibited an increase in ORS scores over the initial assessments, which began to deteriorate following wave 3. Participants assigned to the rural intervention condition showed a steady decline in the ORS across all waves, whereas those in the rural control condition exhibited an initial decline but began to improve following wave 2.

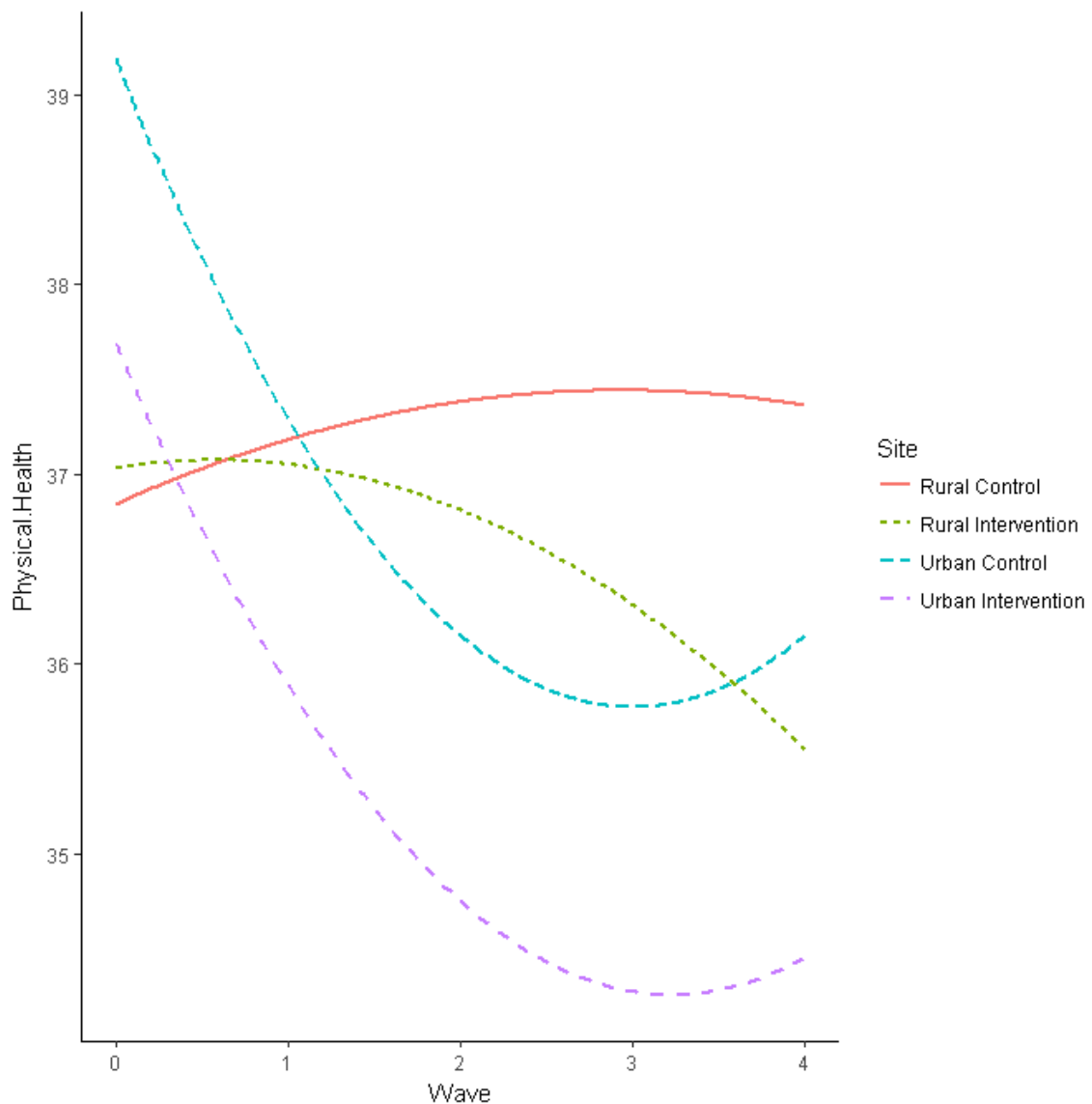
**Figure 6:** Site-specific Growth Trajectories for Client Functionality via Mental Health



**Secondary Aim 2: Increase client functionality via mental and physical health.**

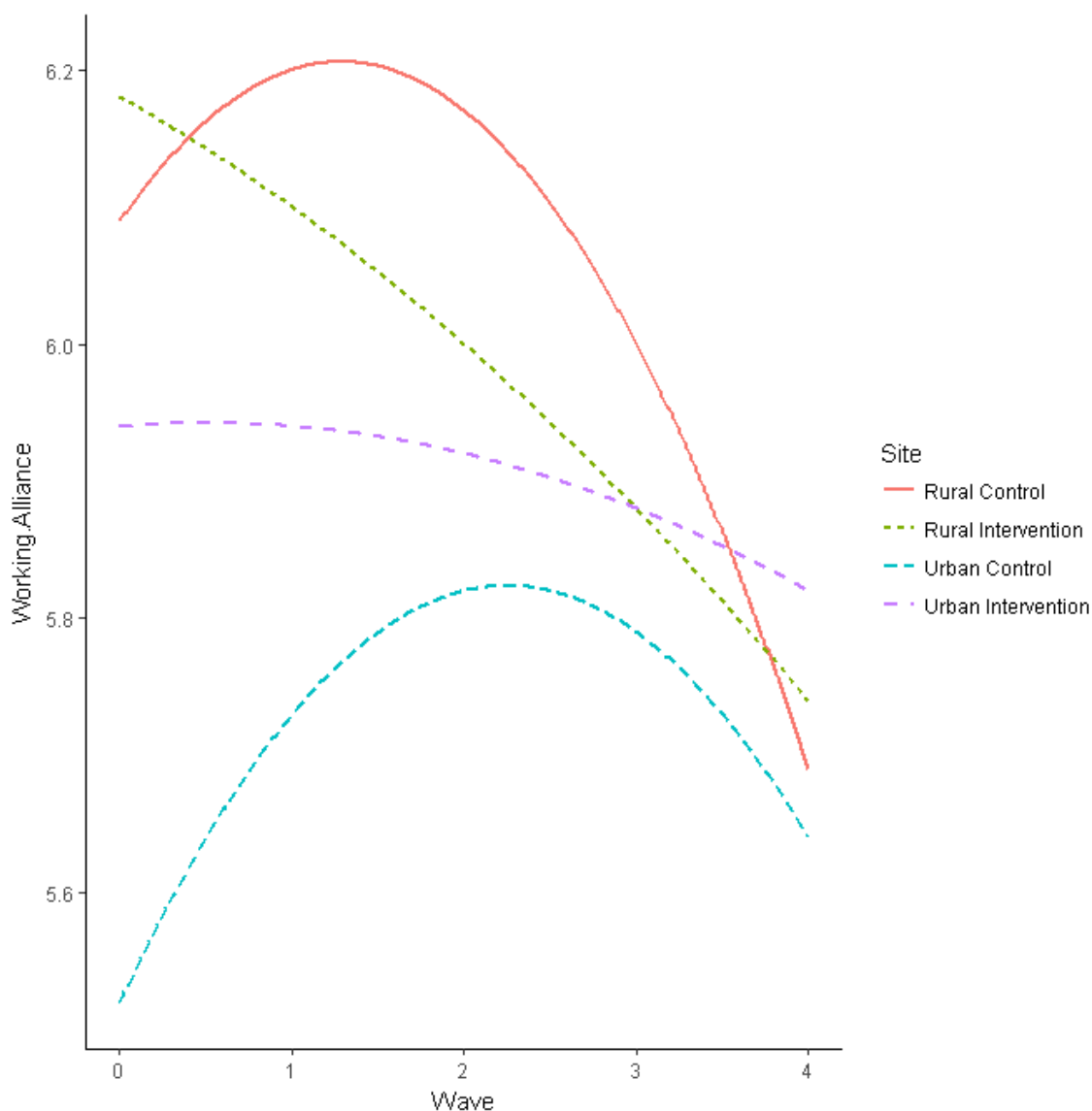
Client functionality: Mental health. First-order treatment effects for the secondary outcome of mental health were not significant. Site-specific trajectories are illustrated in Figure 7. Participants in the urban intervention site reported notably higher functioning scores at baseline, whereas clients in the rural intervention site were much lower. Trajectories were relatively flat across all conditions.

**Figure 7.** Site-specific Growth Trajectories for Client Functionality via Physical Health



Client functionality: Physical health. None of the coefficients that describe the effects of location or treatment reached significance. The site-specific trajectories illustrated in Figure 8 suggest that participants in the urban setting showed notable declines in physical health over the first 3 waves of the study, but these decreases began to reverse between waves 3 and 4. In contrast, clients at the rural control site showed very little change across the assessment period, whereas the trajectory for the rural intervention condition was initially flat but began to decline as the study progressed. The fixed intercept for client functionality via physical health reflected an average score of  $\gamma_{00} = 37.69$  across groups at baseline.

**Figure 8:** Site-specific Growth Trajectories for Perceived Therapeutic Support via Working Alliance



## Sensitivity Analysis

We tested the validity of our use of our quadratic growth curve model by evaluating the incremental explanatory power of cubic growth components, including fixed effects, corresponding location, condition, and location–condition interactions, as well as the corresponding random components. Because our primary (quadratic) model was nested within the cubic model, we used likelihood ratio difference (LRD) tests to test the significance of the fixed ( $df = 4$ ) and random effects ( $df = 4$ ) associated with the cubic model. Ordinary Maximum likelihood (ML) (rather than restricted ML) was used for these analyses so that the change in  $-2LL$  could be used to compare models with different fixed effects. Unfortunately, the models with cubic specifications for treatment understanding (shared decision making) and treatment progress (quality of life) outcomes failed to converge. Analyses of the remaining outcomes revealed that, relative to the primary analysis model (quadratic fixed and random effects), inclusion of the cubic-fixed-only terms ( $df = 4$ ) did not result in a statistically significant change in the  $-2LL$  estimate across any of the 5 outcomes. Moreover, 4 of the 5 outcomes exhibited a nonsignificant LRD test with the simultaneous inclusion of cubic fixed and random effects ( $df = 8$ ). Only the fit of the model that examined WAI scores was improved through the inclusion of cubic effects, but only if their error (random) terms were also included. However, because none of the individual fixed cubic effects were statistically significant, the fitted trajectories were practically indistinguishable from those in the quadratic model. Because the cubic model failed to converge for 2 of the outcomes and was significant for only 1 other outcome but was of no practical consequence, the quadratic model was retained.

A standard Repeated Mixed ANOVA was also estimated using PROC MIXED, with wave specified as a fixed within-subjects factor, and location and condition as between-subjects factors, along with all possible interactions. An unstructured (R-side) covariance matrix was specified to capture dependence among repeated assessments. The primary (quadratic growth curve) model is much more parsimonious in both fixed and random effects, but it is not nested within the ANOVA, so LRD tests are not appropriate. However, examination of information criteria indexes that may be used to compare non-nested models (eg, BIC) yielded mixed results, with some combinations of outcomes and indexes preferring the ANOVA and others the

quadratic LGCM. Comparing the tests of ANOVA main effects and interactions to the first-order and interaction effects in the LGC suggests that these specifications provide converging conclusions regarding the patterns of change in outcome scores across location and condition. As such, the quadratic LGC was retained as the primary analytic framework because it was able to provide a more parsimonious replication of the observed scores over time.

### **Tertiary Study Aim Results: Qualitative Exit Interviews**

The thematic analysis coding process of qualitative data from individual exit interviews that solicit feedback about the mPOWR intervention yielded 3 main theme categories, each with multiple subcategories of themes. These themes included (1) extent of intervention adoption (no or limited participation in intervention; participated in intervention); (2) general impressions of mPOWR (positive, negative, or neutral reactions, and experienced benefits of the intervention); and (3) challenges/barriers to mPOWR participation and utility, which included 4 subtypes of challenges (institutional, client-side challenges, provider-side challenges, and challenges related to the design and content of the intervention). Frequencies and percentages of endorsement of each category are provided in Table 6.

Table 6. Qualitative Themes From Exit Interview Feedback About the mPOWR Intervention<sup>a</sup>

Theme Category	Themes	N (%) (Total Interviewed N = 77)
Intervention Adoption	No or limited participation in intervention	21 (27.3%)
	Participated in intervention	19 (24.7%)
General Impressions of mPOWR	Positive reaction to the intervention	20 (26.0%)
	Negative reaction to the intervention	12 (15.6%)
	Neutral reaction to the intervention	3 (3.9%)
	Experienced benefits of the intervention	72 (93.5%)
Challenges/Barriers	Institutional challenges	42 (54.5%)
	Challenges from the client side	38 (49.4%)
	Challenges from the provider side	19 (24.7%)
	Challenges related to the design and content of the intervention	5 (6.5%)

<sup>a</sup> There were 28 responses that did not fit with the listed theme codes, categorized instead as “Other” themes. Many of these responses were unrelated to current services or to mPOWR.

Extent of Intervention Adoption. Of the 77 participants interviewed, 40 provided data about their level of participation in the mPOWR intervention. In total, 21 (27.3%) reported no or limited participation in the intervention, and 19 (24.7%) reported that they participated in the mPOWR intervention.

General Impressions of mPOWR. Twenty (20.6%) participants who participated in the qualitative interviews had positive reactions to and impressions of the mPOWR intervention (15.6% reported negative reactions and 3.9% reported neutral reactions). In addition, 93.5% (N = 72) mentioned that the intervention yielded some benefit for them, including yielding benefits from mPOWR decision aids and tools, being more involved or engaged, having more goals, feeling more connection and caring from their provider, or experiencing improved treatment planning and satisfaction or self-esteem.

Barriers and Challenges of mPOWR. Institutional challenges (eg, large caseloads, staff turnover, funding threats to the programs and organizations, poor management by administration) were the most commonly reported type of barrier to the use and utility of the mPOWR intervention (N = 42, 54.5%), particularly in the rural intervention site. For example, throughout the exit interviews at the rural intervention site, participants reported clear anxiety that their clinic would be shut down and services discontinued (eg, “I pray they stay open”). Others at the rural intervention clinic expressed that their site’s reduction in services—such as the discontinuation of peer groups and other group events— was a salient challenge.

Challenges from the client side were the next commonly reported barrier to mPOWR participation (N = 38, 49.4%). These challenges mostly included external factors, illness, disability, financial difficulties, mistrust or motivation, or other incapacitating events in the client’s life.

Challenges from the provider side were the third most commonly reported barrier (N = 19, 24.7%). For example, participants reported that their providers did not integrate mPOWR into their sessions often enough, that the providers did not implement mPOWR as was intended (eg, providers did not integrate client’s opinion, only distributed decision aids without explanation), or that issues with the provider–client relationship impeded mPOWR’s success (eg, providers were intimidating, unfriendly, or distant; providers missed appointments; clients

felt stigmatized by their site and its providers). Challenges related to the design and content of the mPOWR intervention was the least frequently reported barrier (N = 5, 6.5%).

## Discussion

### Context for Study Results

Overall, study results were contrary to the 3-primary study aims and did not confirm main hypotheses regarding improved outcomes for clients engaged in the mPOWR shared decision-making intervention. Compared with usual care conditions, the mPOWR intervention did *not* yield greater improvement in (1) treatment engagement and participation in shared decision making via decision satisfaction or communication satisfaction (primary study aim 1), (2) client treatment understanding (primary study aim 2), (3) perceived therapeutic support via working alliance (primary study aim 3), (4) treatment progress and general quality of life (secondary aim 1), or (5) client functionality via mental and physical health (secondary aim 2).

For the most part, findings did not indicate significant treatment effects. In fact, one of the only significant effects involving the treatment factor emerged for treatment engagement and participation in SDM via decision satisfaction, but it was part of a higher-order interaction involving location and the initial linear effect of wave. A significant treatment effect also emerged for perceived therapeutic support via working alliance, but in the opposite direction expected: The intervention sites had less initial linear growth in perceived therapeutic support via working alliance compared with control sites.

Instead, most cross-site differences in outcome trajectories emerged as a function of location. For example, most outcome variables indicated baseline differences by location, with urban participants mostly reporting worse baseline levels than rural sites on treatment engagement and participation in SDM via decision satisfaction, perceived therapeutic support via working alliance, treatment progress and general quality of life, client functionality via mental health, and treatment understanding (in the urban control site only). On one outcome, treatment engagement and participation in SDM via communication satisfaction, urban participants reported better baseline levels than rural participants. The urban participants also reported greater overall declines in clinical functionality via physical health and communication



satisfaction in the early portions of the study, with some recovery in the later study waves, particularly in communication satisfaction.

Additionally, although the pattern was not uniform across all study variables, clients assigned to the urban clinics exhibited a fairly robust parabolic (inverted-U shape) growth function on 4 of the 7 outcomes (treatment engagement and participation in SDM via decision satisfaction, perceived therapeutic support via working alliance, treatment understanding, and treatment progress and general quality of life). Specifically, the urban participants initially improved more than rural participants (across treatment condition) in treatment understanding and treatment progress and general quality of life (and the urban control group in decision satisfaction and perceived therapeutic support working alliance) but declined in later time points of the study.

*Salience of the Location Effect.* There are 2 main explanations for the unexpected salience of the location effect. First, stresses more common in urban environments, such as socioeconomic stress, greater prevalence of mental disorders, a more sedentary lifestyle, housing struggles, crowding, and air pollution,<sup>60,61</sup> are consistent with lower initial baseline scores in therapy and general outcomes in the urban compared with rural groups of the current study, and with early initial gains that decline over the course of mental health services.

Alternatively, the effect of location may have outweighed that of treatment because of age differences. The urban intervention and control sites were both geriatric client-serving clinics (average age of 67-70), whereas both rural intervention and control sites were adult clinics (average age of 47). Higher prevalence of medical disorders, cognitive impairment, or subsyndromal depression symptoms in older adults than younger adults,<sup>62,63</sup> for example, may be reflected in poorer initial baseline outcome scores. The challenges of adapting mental health services to the specific cognitive, medical, or psychosocial needs of older adults<sup>64</sup> may be consistent with the initial gains followed by later declines in study outcomes for the urban (geriatric) participants.

*Summary of Tertiary Study Aims (Qualitative Findings).* Qualitative data may be particularly valuable in ascertaining the potential intervention benefits of those who

participated in mPOWR. Considering some of the limitations associated with the quantitative outcome data, these qualitative data yielded some of the most valuable findings within the current study and can inform future efforts to implement or research shared decision-making interventions in CMH.

Overall, qualitative data analysis indicated that some participants did benefit from mPOWR and found their experience to be positive. However, among participants who provided qualitative information about their extent of participation in the intervention, a roughly equal number of participants reported having participated in the mPOWR intervention as reported having no or little participation in the mPOWR intervention. These data suggested that adoption and fidelity issues likely interfered with the valid interpretation of the quantitative outcome data. Unfortunately, the lack of comprehensive assessments of fidelity precluded controlling for fidelity or adoption in the primary and secondary outcome data.

Qualitative data also provided an understanding of some of the barriers and challenges that made adoption of a shared decision-making intervention like mPOWR difficult within a CMH setting. These data suggest that external factors (institutional or events in the client's life) or implementation issues (lack of fidelity by the provider) are the challenges that need the most attention when mPOWR is implemented in a CMH setting, and not the structure or content of the mPOWR intervention itself. Yet, it is still possible that the design of the mPOWR may have contributed to some of the implementation issues experienced in the provider–client relationship; more research is needed to further explore the specific implementation challenges associated with shared decision making in community mental health settings.

### **Generalizability of the Findings**

We chose the community mental health treatment facilities that served as clinical sites in the current study as representative of typical CMH organizations with a long-standing commitment to serving people with chronic serious mental illness (psychotic disorders, bipolar disorders, or severe depressive disorders). These treatment facilities typically serve clientele with complex mental, physical, and psychosocial health needs. ;as such, generalizability of other study sites to similar urban and rural CMH facilities. However, unusual institutional challenges (eg, the rural intervention site almost closing due to financial insolvency), implementation

difficulties, and the study's lack of a treatment adoption or fidelity measure (see the Limitations section for a discussion of relevant barriers) interfere with the ability to generalize the study's largely null findings to SDM in other CMH settings.

### **Implementation of Study Results**

Given the study's lack of an mPOWR treatment effect (intervention versus control), implications for implementation of mPOWR in other settings are limited. However, a discussion of barriers encountered in the study may provide important insights. For example, the lack of an expected mPOWR treatment effect (intervention versus control) may be explained by implementation and adoption challenges. Unique history and organizational factors inherent to the 2 urban and rural intervention sites (and unrelated to the mPOWR intervention itself) made intervention training, implementation, and fidelity difficult. Because the study was executed at community sites where clinical crises and staff or leadership turnover are not unusual,<sup>65</sup> fluctuations in clinical and therapeutic outcomes may be influenced by factors inherent in the client's treatment or environmental context rather than the treatments themselves. Although the urban and rural intervention sites were randomly chosen by coin flip, throughout the study, the 2 intervention sites experienced notably greater organizational chaos and lower stability than both control sites. The urban intervention site, for example, experienced 50% clinical staff/program manager turnover during waves 3 and 4, when many of the clinical outcomes demonstrated a downturn in the study data. During the study, the rural intervention site experienced a near-shutdown because of fiscal insolvency (with many clients confused about whether the agency remained open for services), inability to complete clinical staff payroll, and high turnover in leadership (3 directors served in the span of 2 years). Continued training and support of the mPOWR intervention during these organizational changes at both intervention sites posed important challenges. Altogether, these historical effects and organizational barriers may have dampened any positive trajectory related to therapeutic or general outcomes related to the mPOWR intervention itself.

An examination of qualitative information from study exit interviews with client participants sheds some light on the extent to which the lack of treatment adoption may explain the lack of a treatment effect. Of the 40 out of 77 clients in the intervention groups who

were asked whether they participated in mPOWR, 52.5% (N = 21) indicated that they did not consistently participate (or did not participate at all) in the intervention, and 47.5% (N = 19) indicated recalling the specifics of the intervention or participating in the intervention. Because the question about participation level was not a stock item in the qualitative interview protocol, the remaining 37 individuals were not reliably queried about their participation in the intervention. These data suggest that implementation challenges likely yielded problems with intervention adoption that may have interfered with valid quantitative data regarding a treatment effect. Unfortunately, reliable information regarding treatment adoption or fidelity was unavailable for inclusion in the latent growth curve analyses as a control variable.

### **Subpopulation Considerations**

Hypothesized treatment effects could have been shrouded by a confounding effect of ethnic differences. However, a follow-up analysis examining ethnicity (ethnic minority versus Caucasian) as a predictor to the existing latent growth curve analysis did not show any consistent patterns in ethnicity by treatment interactions across study outcomes. Ethnic minorities did not report a differential response than Caucasians to the mPOWR intervention on study outcomes.

### **Study Limitations**

Several limitations are important to note when understanding the scope and data from the current study. First, although the clinic sites were randomly assigned to the intervention versus control conditions, individual clients were not randomized. This quasi-experimental design introduces several confounding variables (eg, age, ethnicity, characteristics specific to the sites) that made it difficult to draw definitive conclusions about the intervention's effectiveness.

Second, as previously discussed, difficulties with mPOWR implementation posed challenges for validity of the treatment data. Repeated training on the mPOWR toolkit involved video, direct training, on-site supervision, and accessible phone consultation with the trainer. The 2 intervention sites had different mental health system demands on the staff; in the urban sites, a mandatory statewide reporting tool still had to be used that made completing the

mPOWR Questionnaire seem redundant, whereas the rural intervention site adopted mPOWR as the mandatory reporting tool. In both settings, management was not fully supportive of adoption and did not commit to fidelity to mPOWR. In addition, staff were resistant to learning and adopting “yet another” new instrument and having to adapt their habits of interactions with their clients, and they exhibited resistance to the possibility that they might not already be performing excellent shared decision making. The latter was an often silent and passive resistance to implementation of mPOWR with consistency and fidelity. In further evaluation of the effectiveness of such interventions, full support and buy-in from organizational leadership would be beneficial.

Third, the lack of a reliable intervention adoption or fidelity measure was a significant factor limiting the ability to examine whether poor intervention adoption explained the lack of treatment effect in study analyses. By design, the mPOWR intervention was administered by a set of case managers and clinicians employed at the study’s CMH sites, who were separate from the research team that collected study outcome data and conducted exit interviews. This design made it possible for outcome data to be collected independent of whether clients participated in the intervention. In addition, the absence of fidelity measurement made it difficult to know when and how the interventions were delivered differently. Conclusions about the lack of a treatment effect should be interpreted with caution, and future research regarding the mPOWR intervention should include a consistent intervention adoption and fidelity measure completed by the clients and providers themselves.

With these limitations in mind, the high overall rates of participant attrition introduced bias in the outcome data and impeded the ability to draw definitive conclusions from the study outcome data. More attrition occurred in the intervention sites (47% loss of clients) than the control sites (30% attrition). As discussed, although there were a disproportional number of barriers in the intervention sites that may have accounted for these differential rates of attrition (eg, therapist turnover, changes in management, organization-level fiscal crises), it is possible that the intervention itself created barriers for clients. For example, the extra time and effort required for the therapists to learn and implement mPOWR could have interfered with their attention and ability to connect with their clients. Clients may have been disinterested in

an intervention that they were randomly assigned to, or they may have found the intervention materials complicated and disruptive to the relationship with their therapists (especially if they had already been working with a different modality).

A fourth limitation was that not all participants completed qualitative exit interviews about their experiences. As people participated longer, their willingness to participate in a final interview increased. Client participants who left the study in the first 18 months often did not leave valid contact information, declined to respond, or were not willing to answer any further questions. Therefore, it is not possible to estimate any skew of influence that completing greater numbers of research questionnaires might have on attitudes toward receiving services and to the implementation of the mPOWR toolkit in the qualitative data.

Fifth, qualitative interviews with clients were recorded utilizing detailed notes rather than audiotape and transcription. Although the research assistant interviewers were closely trained and monitored by the research lead investigator, notetaking of the qualitative interviews raises questions about the accuracy of notes, particularly because the research assistant was simultaneously conducting the interview and taking notes. As such, qualitative data may represent a biased representation of the feedback or may have captured broad themes while missing fine details. Future qualitative research on barriers to the use of shared decision making in community mental health should utilize transcription as a preferred methodology.

Finally, because the research outcome questionnaires adhered to designs previously published and validated, many of the questions referred to a “decision” made by 2 participants in SDM. Within medical settings where SDM has been most commonly used, these “decisions” are often well-defined decisions regarding treatment such as a prescribed medication. In contrast, in the setting of chronic mental illness, a degree of ambiguity exists about which decision or set of decisions are the focus for consideration. This concern may have introduced a source of ambiguity and inconsistency in the outcome measures. As participants got more familiar with the questions, it is unclear to what extent they changed their concept of how they were choosing to answer these questions.

### **Future Research**

Overall, the current study suggested that utilization of SDM interventions with CMH clients with mental illness holds notable challenges. Flexibility and adaptation are likely needed to maintain progress within a shared decision-making intervention while responding to sudden and acute changes in clients' lives (eg, housing, substance, or employment issues) or organizational functioning (eg, staff turnover, funding or policy changes). Collaborative treatment decision making, and empowerment are certainly consistent with core principles of wellness and recovery in CMH, and qualitative data indicated that SDM tools could be positively received. However, more effectiveness and treatment adaptation research is needed to further investigate the approach needed to ensure successful implementation of intervention and training protocols such as mPOWR.

### **Conclusions**

Contrary to expectations, study results showed that the CMH-based shared decision-making Moving Patient Outcomes toward Wellness and Recovery intervention did not yield greater improvement in primary outcomes (treatment engagement and participation in SDM via decision satisfaction and communication satisfaction, client treatment understanding, and perceived therapeutic support via working alliance) or secondary outcomes (treatment progress and general quality of life, and client functionality via mental health and physical health) compared with usual care. Instead, the most robust effect was driven by urban versus rural location, with urban control and intervention sites generally reporting worse baseline levels and a greater likelihood of initial improvement followed by later declines on study outcomes, compared with rural sites. These urban versus rural differences may be confounded by and explained by age, with urban sites comprised of older adults and rural sites of adults.

Challenges of implementation within complex and constantly changing CMH environments may have shrouded a true treatment effect. In fact, qualitative data suggested that intervention condition participants may have had low participation with the mPOWR intervention. Qualitative analyses also confirmed conjectures that institutional/organizational and implementation challenges served as primary barriers to the use and utility of the mPOWR intervention, rather than the structure or content of the intervention itself. For those who completed the study, qualitative data showed that clients reported positive experiences with,

and perceived benefits from, the mPOWR intervention.



## References

- 1) Wagner EH et al. Quality improvement in chronic illness care: a collaborative approach. Joint Commission. *J Qual Improvement*. 2001;27:63-80.
- 2) Meuseruser KT, Corrigan PW, Hilton DW, et al. Illness management and recovery: a review of the research. *Psychiatr Serv*. 2002; 53:1272-1284.
- 3) World Health Organization. *The World Health Report 1995—Bridging the Gaps*. Geneva, Switzerland: The World Health Organization; 1995.
- 4) Rice D, Miller L. The economic burden of schizophrenia: conceptual and methodological issues, and cost estimates. In: Moscarelli M, Rupp A, Sartorius N, eds. *Handbook of Mental Health Economics and Health Policy*. Vol 1. New York, NY: John Wiley and Sons; 1996:321-324.
- 5) Heisler M, Vijan S, Anderson RM, et al. When do patients and physicians agree on diabetes treatment goals and strategies and what difference does it make? *J Gen Intern Med*. 2003;18:893-902.
- 6) Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *JAMA*. 2002;288:2469-2475.
- 7) Adams JR, Drake RE, Woldford GL. Shared decision-making in preferences of people with severe mental illness. *Psychiatric Serv*. 2007;58: 1219-1221.
- 8) Noble LM, Douglas BV. What users and relatives want from mental health services. *Curr Opin Psychiatry*. 2004;17:289-296.
- 9) Gibson P, Powell H, Coughlan J. Limited (information only) patient education programs for adults with asthma. *Cochrane Database of Systematic Reviews* 2002, Issue 1. Art. No.: CD001005. DOI: 10.1002/14651858.CD001005.
- 10) Newman S, Steed L, Mulligan K. Self-management interventions for chronic illness. *Lancet*. 2004;364:1523-1537.
- 11) Carpenter W, Gold JM, Lahti AC, et al. Decisional capacity for informed consent in schizophrenia research. *Arch Gen Psychiatry*. 2000;57:533-538.
- 12) Adams JR, Drake RE, Wolford GL. Shared decision-making in preferences of people with severe mental illness. *Psychiatr Serv*. 2007;58:1219-1221.
- 13) O’Neal EL, Adams J, McHugo G, et al. Preferences of older, middle-aged and younger adults with severe mental illness for involvement in shared decision making in medical and psychiatric settings. *Am J Geriatr Psychiatry*. 2008;16:826-833.

- 14) Cortes DE, Mulvaney-Day N, Fortuna L, et al. Patient-provider communication: understanding the role of patients activation for Latinos in mental health treatment. *Health Educ Behav.* 2008;1-17.
- 15) Patel SR, Bakken S, Ruland C. Recent advances in shared decision making for mental health. *Curr Opin Psychiatry.* 2008;21(6):606.
- 16) Seale C, Chaplin R, Lelliott P, et al. Sharing decisions in consultations involving antipsychotic medication: a qualitative study of psychiatrists' experiences. *Soc Sci Med.* 2006;62:2861-2873.
- 17) Goosensen A, Zijlstra P, Koopmanschap M. Measuring shared decision making processes in psychiatry: skills versus patient satisfaction. *Patient Educ Couns.* 2007;67:50-56.
- 18) Angel M. Respecting the autonomy of competent patients. *N Engl J Med.* 1984;310(17):1115-1116.
- 19) Happell B, Manias E, Roper C. Wanting to be heard: mental health patients' experience of information about medication. *Int J Ment Health Nurs.* 2004;13(4):242-248.
- 20) Montori VM, Gafni A, Charles C. A shared treatment decision-making approach between patients with chronic conditions and their clinicians: the case of diabetes. *Health Expect.* 2006;9:25-36.
- 21) Kohn, LT, Corrigan JM, Donaldson MS. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, DC: Committee on Quality of Health Care in America, Institute of Medicine; 2001.
- 22) Institute of Medicine (US), Committee on Comparative Effective Research Prioritization, & Institute of Medicine (US). *Initial National Priorities for Comparative Effectiveness Research.* Washington, DC: National Academies Press; 2009.
- 23) Malm U, Ivarsson B, Allebeck P, Falloon I. Integrated care in schizophrenia: a two-year randomized controlled study of two community-based treatment programs. *Acta Psychiatr Scand.* 2003;107:415-423.
- 24) Van Korff M, Katon W, Rutter C, et al. Effect on disability outcomes of a depression relapse prevention program. *Psychosom Med.* 2003;65:938-943.
- 25) Hamann J, Langer B, Winkler V, et al. Shared decision making for in-patients with schizophrenia. *Acta Psychiatr Scand.* 2006;114:265-273.
- 26) Priebe S, McCabe R, Bullenkamp J, Hansson L, Lauber C, Martinez-Leall R. Structured patient- clinician communication and 1-year outcome in community mental healthcare. *Br J Psychiatry.* 2007;191:420-426.

- 27) Loh A, Simon D, Wills CE, Kriston L, Niebling W, Harter M. The effects of a shared decision-making intervention in primary care of depression: a cluster-randomized controlled trial. *Patient Educ Couns*. 2007;67:324-332.
- 28) Joosten EAG, de Jong, C, de Weert-van Oene G, et al. Shared decision-making reduces drug use and psychiatric severity in substance-dependent patients. *Psychother Psychosom*. 2009;78:245-253.
- 29) Woltmann EM. Development and Investigation of a Decision Support System to Facilitate Shared Decision Making in Community Mental Health [dissertation]. Hanover, NH: Dartmouth Medical School; 2009.
- 30) Mueser KT, Drake, RE. Treatment of co-occurring substance use disorders using shared decision making and electronic decision support systems. In: Rudnick A, Roe D, eds. *Serious Mental Illness (SMI): Person Centered Approaches*. Abingdon, United Kingdom: Radcliff Press. 2011:213-231.
- 31) Mueser KT, Glynn SM, Liberman RP. Behavioral family management for serious psychiatric illness. *New Dir Ment Health Serv*. 1994:37-50.
- 32) Mueser KT, Corrigan PW, Hilton DW, et al. Illness management and recovery: a review of the research. *Psychiatr Serv*. 2002;53:1272-1284.
- 33) Miller AL, Crismon MI, Rush AJ, et al. The Texas Medication Algorithm Project: clinical results for schizophrenia. *Schizophr Bull*. 2004;30:627-647.
- 34) Center for Mental Health Services, Substance Abuse and Mental Health Services Administration. *Shared Decision-making in Mental Health Care: Practice, Research, and Future Directions*. U.S. Department of Health and Human Services: Rockville, MD; 2010. HHS publication SMA-09-4371.
- 35) Adams JR, Drake RE. Shared decision-making and evidence-based practice. *Community Ment Health J*. 2006;42(1):87-105.
- 36) The WHOQOL Group. The World Health Organization WHOQOL-BREF quality of life assessment. *Psychol Med*. 1988;28:551-558.
- 37) Smith MK, Ford J. A client-developed functional level scale: the Community Living Skills Scale (CLSS). *J Soc Serv Res*. 1990;13(3):61-84.
- 38) Ralph RO, Kidder KA. Can we measure recovery? A summary of recovery instruments. Paper presented at the National Conference on Mental Health Statistics, 1999; Washington, DC.
- 39) Institute of Medicine (US). *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Washington, D.C.: National Academies Press; 2012.

- 40) Boyatzis RE. Transforming Qualitative Information: Thematic Analysis and Code Development. Thousand Oaks, CA: Sage; 1998.
- 41) Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
- 42) Wills C, Holmes-Rover M. Preliminary validation of the Satisfaction With Decision scale with depressed primary care patients. *Health Expect*. 2003;6:149-159.
- 43) Campbell C, Lockyer J, Laidlaw T, et al. Assessment of a matched-pair instrument to examine doctor-patient communication skills in practising doctors. *Med Educ*. 2007; 41(2):123-9.
- 44) Kriston L, Scholl I, Hölzel L, et al. The 9-item Shared Decision Making Questionnaire (SDM-Q-9). Development and psychometric properties in a primary care sample. *Patient Educ Couns*. 2010;80(1):94-99.
- 45) Hanson W, Curry K, Bandalos D. Reliability generalization of working alliance inventory scale scores. *Educ Psychol Meas*. 2002;62(4):659-673.
- 46) Horvath A, Greenberg L. Development and validation of the Working Alliance Inventory. *J Couns Psychol*. 1989;36:223-233.
- 47) Miller S, Duncan B, Brown J, et al. The Outcome Rating Scale: a preliminary study of the reliability, validity, and feasibility of a brief visual analog measure. *J Brief Ther*. 2003;2(2):91-100.
- 48) Ware JJ, Kosinski M, Keller S. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care*. 1996;34(3):220-233.
- 49) Gill SC, Butterworth P, Rodgers B, et al. Validity of the mental health component scale of the 12-item Short-form Health Survey (MCS-12) as measure of common mental disorders in the general population. *Psychiatry Res*. 2007;152(1):63-71.
- 50) Singer JD. Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *J Educ Behav Stat*. 1998;24:323-355.
- 51) Singer JD, Willett JB. Applied longitudinal data analysis: Modeling change and event occurrence. [Oxford, United Kingdom](#): Oxford University Press; 2003.
- 52) Raudenbush SW, Bryk AS. Hierarchical Linear Models: Applications and Data Analysis Methods. Vol. 1. Thousand Oaks, CA: Sage Publications; 2002.
- 53) Bollen KA, Curran PJ. Latent Curve Models: A Structural Equations Modeling Perspective. Hoboken, NJ: John Wiley & Sons Inc; 2006.

- 54) McArdle JJ, Nesselroade JR. Longitudinal Data Analysis Using Structural Equations Modeling. Washington, DC: American Psychological Association; 2014.
- 55) Singer JD, Willett JB. Applied Longitudinal Analysis: Modeling Change and Event Occurrence. Oxford, United Kingdom: Oxford University Press; 2003.
- 56) Enders CK. Applied Missing Data Analysis. New York, NY: Guilford Press; 2010.
- 57) Wickham H. ggplot2: Elegant Graphics for Data Analysis. New York, NY: Springer-Verlag; 2009.
- 58) R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing Web site. Available at: <https://www.R-project.org/>. Published 2016.
- 59) Aiken LK, West SG. Multiple regression: Testing and Interpreting Interactions. Newbury Park, CA: Sage Publications; 1991.
- 60) Moore M, Gould P, Keary BS. Global urbanization and impact on health. *Int J Hyg Environ Health*. 2003;206(4):269-278.
- 61) Srivastava K. Urbanization and mental health. *Ind Psychiatry J*. 2009;18(2):75.
- 62) American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA: American Psychiatric Publishing; 2013.
- 63) VanItallie TB. Subsyndromal depression in the elderly: underdiagnosed and undertreated. *Metabolism*. 2005;54(5):39-44.
- 64) Cook, J. M., Gallagher-Thompson, D., & Hepple, J. (2005). Psychotherapy with older adults. In G. O. Gabbard, J. S. Beck & J. Holmes (Eds.), *Oxford textbook of psychotherapy* (pp. 381–390). New York: Oxford University Press.
- 65) Prosser D, Johnson S, Kuipers E, et al. Mental health, “burnout” and job satisfaction in a longitudinal study of mental health staff. *Soc Psychiatry Psychiatr Epidemiol*. 1999;34(6):295-300.

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*Acknowledgement:*

*Research reported in this report was [partially] funded through a Patient-Centered Outcomes Research Institute® (PCORI®) Award (CE-12-11-4309). Further information available at: <https://www.pcori.org/research-results/2013/does-shared-decision-making-improve-care-community-mental-health-clinics>*