ORIGINAL RESEARCH

Aspects of Patient and Clinician Language Predict Adherence to Antidepressant Medication

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Objective: **High-quality patient-clinician communication is associated with better medication adherence, but the specific language components associated with adherence are poorly understood. We examined how patient and clinician language may influence adherence.**

Methods: **We audio-recorded primary care encounters from 63 patients newly diagnosed with depression and prescribed an antidepressant medication. We rated clinicians' language (motivational interviewing–adherent statements [MIAs], reflections, and global ratings of empathy and "motivational interviewing spirit") along with patients' "change talk" (CT) demonstrating motivation to take medication. Filling a first prescription and an estimate of overall adherence, the proportion of >180 days covered (PDC) (primary outcome), were measured based on pharmacy records.**

Results: **Fifty-six patients (88.8%) filled an initial prescription, and mean (standard deviation) PDC across all subjects was 45.2% (33.6%). MIAs, complex reflections, and empathy were associated with more CT (for all: $r_s \geq 0.27$; $P < .05$). Two or more and 0 or 1 CT statements were associated with 63.0% and 36.6% PDC, respectively. Empathy, motivational interviewing spirit, and CT were associated with filling the first prescription (for all: $r_s \geq 0.25$; $P < .05$). In an adjusted analysis, empathy ($t = 2.3$; $P = .027$) and ≥2 CT statements ($t = 2.3$; $P = .024$) were associated with higher PDC.**

Conclusions: **Clinician empathy, reflections, and MIAs may elicit patient CT, whereas empathy and CT seem to enhance filling an initial prescription and PDC. (J Am Board Fam Med 2013;26:409–420.)**

Keywords: **Antidepressive Agents, Communication, Depression, Patient Adherence, Quantitative Evaluation**

Nonadherence to antidepressant medication is one of a few potentially modifiable predictors of a poor clinical outcome for people with depression,[1–3] and up to 50% of adults treated for depression in primary care experience clinically significant nonadherence due to side effects, delay in symptom relief, perceived harm of antidepressant medications, and other factors.[4,5] Up to 10% experience primary nonadherence due to not picking up the initial prescription.[6,7] Despite decades of research, there is currently a lack of knowledge about simple, effective interventions to improve medication adherence, and a Cochrane review concluded that most adherence interventions failed to achieve enduring medication adherence or improve patient outcomes.[8] Meta-analytical evidence identifies the patient-clinician communication process as a critical and modifiable determinant of subsequent antidepressant adherence, and novel interventions targeting aspects of communication hold promise for positive effects.[9–11] Yet which aspects of the clinician's or patient's communication are specifically associated with better or worse adherence are unclear.

Researchers in the field of motivational interviewing (MI), a patient-centered style of communication intended to help patients resolve ambivalence and work toward improving a targeted maladaptive behavior,[12] have developed instru-

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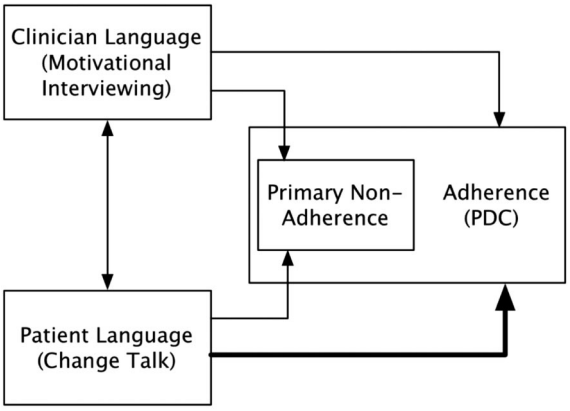
ments to measure components of the clinician's and patient's language that may be associated with medication adherence. Regarding clinician language, relational components (empathy and interpersonal spirit) and technical components (reflective listening and MI-adherent statements, including affirming and supporting patient autonomy) have predicted decreased abuse among patients with substance abuse problems.[12,13]

A second instrument assesses a type of patient language called "change talk" (CT), which expresses motivation regarding changing an unhealthy behavior. Among problem drinkers, CT strongly predicted alcohol moderation and cessation. The flip side of CT, "sustain talk" (ST), indicates a desire to continue specific adverse behaviors and has predicted worse outcomes in substance abuse settings.[14,15] CT and ST regarding taking an antidepressant medication may be predictive of better and worse adherence, respectively. While previous studies noted mixed results regarding the effect of an MI intervention on medication adherence,[16,17] to our knowledge none have examined the effects of specific components of patient and clinician language on adherence.

For this analysis, we chose to examine possible patient- and clinician-level language predictors (CT and language consistent with MI, respectively) of an estimated measure of adherence to antidepressant medication. Our primary hypothesis was that patients beginning a new treatment episode for depression and verbalizing CT regarding adherence to antidepressant medication during a baseline clinical encounter would exhibit higher estimates of adherence to medication over 180 days. We also made secondary hypotheses that language consistent with MI, including MI-adherent statements and reflective listening, would be associated with increased CT, with increased odds of filling a prescription for an antidepressant medication and a higher estimate of adherence to antidepressant medication (Figure 1).

Figure 1. Theoretical model relating aspects of clinician and patient language to medication adherence. PDC, proportion of days covered over 180 days of observation.



Methods

We evaluated patients receiving a prescription for an antidepressant medication while participating in a randomized controlled trial (RCT) comparing patient outcomes for primary care clinicians who received MI training and those who did not. In this study patients in both groups were screened for depression with the 9-item Patient Health Questionnaire (PHQ-9) before their visit.[18] All primary care clinicians were notified of the results and interpretation. The visits of patients who were seeing either MI-trained or untrained control clinicians for a clinical visit and screened positive for probable major depression (PHQ-9 score >9) were audio-recorded. We analyzed the language of both the primary care clinicians and patients during the clinical encounter and compiled data from pharmacy sources to determine adherence. All procedures were approved by the Colorado Multiple Institutional Review Board (COMIRB nos. 08-1180).

Setting and Population

The RCT was conducted at an urban safety net health care system in Denver, Colorado. To explore possible linkages between aspects of the clinicians' language, the patients' language, and antidepressant adherence, we focused the current analysis on those patients given an antidepressant prescription. During the RCT time frame, evidence-based psychotherapy was not readily available at the study site.

Eligibility

Patients meeting inclusion criteria for the parent study were English-speaking adults aged 18 years and older who screened positive for probable major depression and who had not taken antidepressant medication in the previous 3 months. Patients were

selected from the RCT sample if they were prescribed an antidepressant medication during the baseline clinical encounter or during a second clinical visit occurring within 60 days of baseline. Patients from both the intervention and control arms of the RCT were included in the analysis. During the consent process, it was stated that the decisions regarding treatment, including but not limited to starting an antidepressant medication, would be the result of discussion between the clinician and patient, and the patient was not directed by study protocol. Complete inclusion and exclusion criteria and a list of antidepressant medications used in the study are available in Appendix 1.

Clinicians

The clinicians in the study included 20 physicians and mid-level practitioners working at the same urban community health care system. None of the clinicians participating in the RCT had prior MI training. Those randomized to the RCT intervention arm (n = 10) were trained to use MI with 8 to 16 hours of classroom training divided into a baseline and 2 follow-up sessions. The MI training encouraged clinicians to frame discussion regarding depression and its treatment with MI principles, but it did not define how best to treat each patient. Each participating clinician received individual feedback, including the MI ratings and an invitation to consider how they would try to improve, during 2 to 4 audio-recorded encounters. All clinicians received a treatment algorithm synthesizing recommendations from the American Psychiatric Association (APA), in addition to a full copy of the APA guidelines for treating major depression.[19]

Language Coding Strategy

Coders listened to recordings of baseline and initial follow-up encounters (occurring within 2 months of baseline) and evaluated clinician and patient language. Language data were collected and evaluated according to the same procedure, regardless of whether the clinician was trained to use MI. Two language coding systems were used (described below): one for clinician language and the other for patient language. Three trained coders independently evaluated patient language, while 2 evaluated clinician language. A research assistant designated as the primary coder was blinded to the randomization status of both patients and clinicians.

Coder Training and Reliability

The MI Treatment Integrity (MITI) code 3.1.1 was used to evaluate clinician language within the encounters.[20] Coders participated in a basic 16-hour MITI training course. The primary coder received an additional 14 hours of training in an advanced course. Only the primary coder's MITI scores were used for analytical purposes.

The MI Skills Code (MISC) 2.1[21] was used to define and code patient language (CT and ST). Coders met weekly for 1 to 2 hours over 6 months to discuss relevant issues and decide how to uniformly address coding challenges.

Reliability

A total of 75 and 72 audio-recorded encounters were double-coded to determine both interrater reliability for MITI behavior counts and global measures, respectively. Global measures were recoded as a match if the measure between the raters differed by 1 increment.[21] Interrater reliability for the MISC 2.1, a measure of patient language, was determined by double-coding 47 audio-recorded encounters. Reliability was averaged over the 3 coder pairings.

The intraclass correlation coefficient (ICC) was used to measure interrater reliability for continuous measures.[22] For global measures, interrater reliability was measured using the Cohen κ statistic.[23] Interpretation of the intraclass correlation coefficients were poor (<0.40), fair (0.40–0.59), good (0.60–0.74), or excellent (0.75–1.00)[22,24]; κ coefficients were interpreted as poor (≤ 0.20), fair (0.21–0.40), moderate (0.41–0.60), good (0.61–0.80), and very good (0.81–1.00).[23]

Measures

Outcomes: Primary Adherence and Proportion of Days Covered

An index order for antidepressant medication was identified from analyses of audio-recorded clinical visits. However, if a revised order was entered within 30 days of the initial order and the initial order had not been dispensed, the subsequent revised order was chosen as the definitive order.[25] Antidepressant medication is considered a first-line treatment for depression at the study site. In accordance with APA treatment algorithm recommendations, we considered 180 days the minimum duration expected regardless of available refills on the index prescription.[19]

We determined whether prescriptions were obtained by examining pharmacy fill records. Prescriptions could be filled at pharmacies within or outside of the Denver Health system and could be written, sent electronically, or faxed. All prescriptions were for 30-day supplies. All dosage forms were accepted for each antidepressant medication, and dates of dispensing were collected from the pharmacy records. The Denver Health electronic health record (EHR) automatically displays the dates that medications are filled at Denver Health, along with the type of medicine and number of days covered. We asked all patients which pharmacies they used to fill their medication and requested similar medication fill data from external pharmacies.

The medication generic and/or brand names are used consistently on the medication and dispensing lists for internal and all external pharmacies, precluding the need to track National Drug Code numbers (Appendix 1). The principal investigator (RDK) generated a priori a comprehensive list of the generic and trade names of antidepressant medications and updated it as needed by reviewing all medication lists for study participants. Medication orders and dispensings were linked using unique patient identifiers as well as drug identifiers and dates.

For all dispensings, the initial and refill dates, strength, formulation, instructions for use, days' supply, and prescriber's identifier were recorded. When a patient discontinued one antidepressant medication to start another or changed strength or dose for the same medication, the changing prescriptions were amalgamated, with the remaining days of the old script being truncated at the time the new script was filled.

Primary adherence was defined as an initial prescription being filled within 30 days of the index order. Proportion of days covered (PDC) was calculated by dividing the total days' supplied in the observation period by 180 days. This time frame was selected to reflect the minimum time the APA recommends that patients adhere to antidepressants.[19] We opted not to dichotomize this measure because of power considerations, given the small sample size. Dispensing gaps of any length are allowed when calculating PDC. A patient who was prescribed but did not obtain an initial medication would receive a PDC of 0%. Late fills and/or discontinuation would reduce a patient's PDC, and picking up refills at least every 30 days would result in a 100% PDC.

Possible Independent Variables

Language Measures

1. Clinician level: Behaviors consistent with MI—including asking open-ended questions, voicing simple reflections (reflect basic understanding of what patient has said) and complex reflections (add substantial meaning to what patient has said), and providing MI-adherent statements (MIAs)—were tallied. The behaviors consistent with MI are summed for a total MI consistent score.[26] Advising, confronting, or directing the patient without permission is considered MI nonadherent. We also tested whether global ratings of empathy (range 1–5, with 5 being the best) and "MI spirit," an average of global ratings of collaboration, evocation, and support, were associated with outcomes. Clinicians who explored the patient's ideas and opinions, as opposed to simply collecting information, received a higher empathy rating. Appendix 2 defines all MITI codes.
2. Patient level: We ascertained patient CT and ST regarding antidepressant medication. CT is defined as "any language that moves toward change" (eg, "I think medication would improve my mood") and ST as "any language moving away from change" (eg, "Antidepressants make me feel strange") regarding a specific target behavior. Both metrics were measured using the MISC 2.1 (described earlier) and were assessed as continuous measures. We did not specify possible cut points for dichotomization. We considered CT and ST as possible predictors of an estimate of antidepressant medication adherence. The primary hypothesis was that CT would predict better PDC over 180 days.

Other Possible Covariates

Sociodemographic factors (sex, age, race, ethnicity) were collected from clinicians and patients using questionnaires. The clinician's training (nurse practitioner, physician assistant, or MD) was considered. Insurance type (public, private, no insurance) was ascertained from the EHR. We surveyed clinicians' baseline treatment preference for antidepressant medication (yes/no), prior treatment

with antidepressant medication for depression, and depressive symptom score (PHQ-9).[18] We measured physical comorbidity with a count of up to 8 chronic disease categories (arthritis, asthma, congestive heart failure, chronic obstructive pulmonary disease, coronary heart disease, diabetes, hypertension, and lower back pain) from the patient's 12-month problem list in the EHR. Comorbidities coded initially by *International Classification of Diseases 9th Revision* code were categorized, labeled, and sorted automatically by the problem list algorithm in the EHR. Simple disease counts are limited by an inability to define chronicity or severity, yet may be as effective at predicting mortality and health care utilization as more sophisticated methods.[27] Patient's randomization status to intervention (discussion regarding depression framed with MI) or control (clinicians without MI training) was considered, as was the total number of unique medications taken the month during which the antidepressant medication was prescribed. Medications clearly not prescribed for chronic use (eg, a short course of antibiotic medication or a steroid cream) were not included in the total.[28]

The Helping Alliance Questionnaire, a 19-item self-report scale that is a valid and reliable predictor of therapeutic process and outcome, was used to measure the patient's assessment of participating in a collaborative relationship with the primary care clinician. A score <89 is considered poor.[29]

Statistical Analyses

Spearman's correlation coefficient was used to determine associations between possible predictors of interest or covariates and outcomes. Correlations were made on ordinal and continuous measures.

A multivariate generalized linear model tested for possible associations between clinician and/or patient language and the outcome PDC. Factors associated with the primary outcome (PDC) or with the hypothesized predictor (CT) at $P < .20$ were entered by domain (language measures, other clinician factors, other patient factors) and were excluded for $P > .30$. All analyses were done using SAS software version 9.2 (SAS, Inc., Cary, NC). Statistical associations were determined at the α level of 0.05.

Results

Study Participants

Twenty participating clinicians averaged about 50 years of age and were predominately female and non-Hispanic white (Table 1 and Figure 2). Of 160 patients participating in the RCT, 63 received a prescription for antidepressant medication. These 63 participants averaged 50 years of age and were 73% female, 40% Hispanic, 19% non-Hispanic white, 32% non-Hispanic African American, and 9.5% other race/ethnicity. Patient participants seemed to be somewhat less likely to be female and African American and more likely to be uninsured than the population of adults attending the health care system in 2011. RCT participants receiving a prescription were not significantly different from those not receiving a prescription regarding sociodemographic and clinical characteristics, except for having higher baseline depressive symptoms (PHQ-9 score 17.3 vs. 15.0; $F = 12.8$; $P = .0005$). In addition, there was similar allocation between the original RCT treatment arms: 35 patients receiving a script for antidepressant medication (56%) belonged to the intervention arm of the parent RCT.

Reliability

Reliability scores for patient language were good: 0.72 for CT and 0.74 for ST. Reliability scores for MITI measures were generally in the fair to good range (eg, 0.45 for MI nonadherent statements and 0.76 for open questions), although some were poor (eg, 0.34 for MIAs). κ Scores for global ratings showed moderate to good agreement between raters (eg, $\kappa = 0.74$ for empathy). A full list of reliability scores can be found in Appendix 3.

Change and Sustain Talk

Of 63 participants, 48 (76.2%) and 22 (34.1%) voiced CT and ST regarding antidepressant medication, respectively. CT and ST statements per encounter averaged 1.14 (standard deviation [SD], 1.0) and 0.7 (1.2), respectively. Subjects randomized to the intervention had a mean of 1.08 CT statements (SD, 0.93), whereas control subjects averaged 1.21 CT statements (SD, 1.01) ($P = .66$).

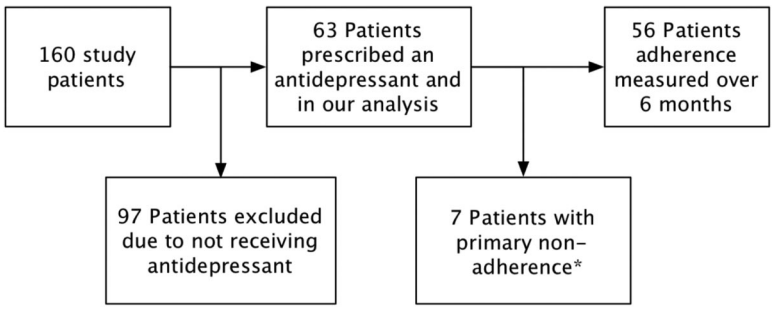
Patients with 0 or 1 CT statements had very similar PDCs, averaging 36.6%, while those with 2, 3, or 4 statements also had similar results, averaging 63.0% (Table 2). Thus we dichotomized CT be-

Table 1. Characteristics of Participants and Comparison of Participants to the General Population of Adults Attending the Health System

Characteristics	Study Participants	General Population
Clinicians (n = 20)		
Female sex	13 (65.0)	
Age, mean years	46.1 (7.2)	
Ethnicity		
Non-Hispanic white	17 (85.0)	
Hispanic	3 (15.0)	
Specialty		
Internal medicine	5 (25.0)	
Family medicine	10 (50.0)	
Nurse practitioner	2 (10.0)	
Physician assistant	3 (15.0)	
Patients (n = 63)		2011 Community Health Adults (n = 67,256)*
Sociodemographic		
Female sex	46 (73.0)	41,990 (62.4)
Age, mean years ± SD (range)	50.0 ± 13.6 (19.7–73.4)	42.4*
Ethnicity		
African American	20 (31.7)	11,539 (17.2)
Non-Hispanic white	12 (19.0)	19,885 (29.6)
Hispanic	25 (39.7)	32,116 (47.8)
American Indian	3 (4.8)	3716 (5.5)†
Multiethnic (non-Hispanic)	3 (4.8)	
Insurance (n = 62)	36 (58.1)	27,319 (40.6)
Public	1 (1.6)	8,006 (11.9)
Private	25 (40.3)	31,928 (47.5)
No insurance		
English-speaking (%)	100	70.9
Physical/mental health		
Baseline PHQ-9 score (severity)	17.5 ± 3.9 (moderately severe)	
Physical comorbidity categories, mean ± SD (range)‡	2.3 ± 1.6 (0–7)	
Treatment factors		
Unique medications, mean ± SD (range)	3.8 ± 2.6 (0–11)	
Previous antidepressant use	27 (42.9)	
Antidepressant adherence		
Obtained initial fill	56 (88.6)	
PDC, mean ± SD (range)	45.2 ± 33.6 (0–100)	
Patient-clinician relationship		
Helping Alliance Questionnaire§	95.1 ± 16.1 (41–109)	
Change/sustain talk, mean ± SD (range)		
Mean change talk statements per encounter‖	1.1 ± 1.0 (0–4)	
Mean sustain talk statements per encounter‖	0.7 ± 1.2 (0–5)	

Values are n (%) unless otherwise indicated.
*Mean age estimated from percentage of adults in age groups (19–34, 3549, 5060, and ≥65 years); overall adult data for the complete system excludes those aged 18 years.
†Categorized as "Other."
‡Physical comorbidities assessed with a count of up to 8 categories (arthritis, asthma, congestive heart failure, chronic obstructive pulmonary disease, coronary heart disease, diabetes, hypertension, and lower back pain).
§Helping Alliance Questionnaire assesses the patient's perception of participating in a collaborative relationship with the primary care clinician. A score of <89 is considered poor.
‖Of 63 patients, 48 (76.2%) voiced any change talk, whereas 22 (34.9%) made any sustain talk. The mean scores are for all 63 patients and were calculated including those with no change or sustain talk statements.
SD, standard deviation; PDC, proportion of days covered. PHQ-9, patient health questionnaire.

Figure 2. Patient flow diagram. *Prescription not picked up.



tween 1 and 2 for analytical purposes. The area under the curve clinical effect size for dichotomized CT would be 0.63, equivalent to a Cohen d of 0.48 (small). ST was not associated with PDC.

Adherence Estimates

Of 63 participants, 56 (88.9%) who were prescribed an antidepressant medication picked up the first prescription within 30 days (primary adherence). Average PDC across the 63 study subjects was 45.2% (SD, 33.3%; range 0–100%) (Figure 2).

Factors Significantly Associated With Change and Sustain Talk

Clinician MI-adherent statements (r_s = 0.27; P = .03), complex reflections (r_s = 0.27; P = .03), and empathy (r_s = 0.28; P = .03) were associated with CT. Increasing patient age was associated with higher ST (r_s = 0.26, P = .04) (data not shown).

Factors Significantly Associated With Primary Adherence

Univariate correlates of filling an initial prescription included patient CT (r_s = 0.25; P = .048), clinician empathy (r_s = 0.30; P = .018), and MI spirit (r_s = 0.30; P = .017). Factors associated negatively with primary adherence included increasing patient age (r_s = −0.42; P = .001) and number of physical comorbid conditions (r_s = −0.32; P = .01) (data not shown).

Table 2. Associations Between Number of Change Talk Statements and Proportion of Days Covered (PDC) Estimates

Change Talk Statements	n	Mean PDC	SD
0	17	0.39	0.32
1	25	0.35	0.32
2	15	0.62	0.33
3	5	0.65	0.29
4	1	0.67	NA

NA, not applicable; SD, standard deviation.

Factors Considered for the Multivariate Model of PDC

Univariate correlates of PDC included patient CT (primary outcome; r_s = 0.38; P = .002), clinician empathy (r_s = 0.20; P = .11), non-Hispanic black race/ethnicity (r_s = −0.22; P = .09), and baseline depressive symptoms (r_s = 0.18; P = .16). History of treatment with antidepressant medication (r_s = −0.24; P = .06) and MI-adherent statements also were considered for inclusion because of association with CT.

Multivariate Model of PDC

In the multivariate analysis, CT (B = 0.19; P = .024), MI-adherent statements (B = −0.03; P = .03), and empathy (B = 0.10; P = .029) were significantly associated with PDC. The model explained 27.6% of the variance in PDC (Table 3).

Table 3. Multivariate Analysis of Estimated Proportion of Days Covered (PDC)

Variable	Estimate	Standard Error	t Value	P
Intercept	0.28	0.12	2.32	.024
Patient change talk	0.19	0.09	2.24	.029
Clinician empathy	0.10	0.04	2.27	.027
Clinician MI-adherent statements	−0.03	0.01	−2.22	.03
Previous antidepressant use	−0.12	0.08	−1.39	.17
African American (non-Hispanic)	−0.16	0.08	−1.87	.07

R^2 = 27.6% (n = 63). MI, motivational interviewing.

Discussion

Overall, clinician MI-adherent statements, complex reflections, and empathy were associated with higher patient CT regarding antidepressant. This is the first study of which we are aware to demonstrate that empathy, MI Spirit, and CT are associated with better odds of filling an initial prescription, and that empathy and CT predicted higher estimated medication adherence over 180 days. Taken together, the results suggest that clinician MI-concordant language and global empathy may positively influence patient CT and adherence to antidepressant medication.

Pirlott et al[30] described correlations between clinician empathy, MI spirit, and MI-consistent behaviors and CT and between CT and improved fruit and vegetable intake. Other studies have reported similar nonoverlapping linkages between clinician MI and CT and between CT and more healthful behaviors, but not directly between MI measures and healthful behaviors.[14,15,31–33] In contrast to previous studies, we report an association between empathy and the behavioral outcome of PDC. While clinician MIAs seemed to positively influence primary adherence and patient CT, there was a small yet significant negative effect on PDC after adjustment for CT, which may reflect clinician support for patient decision-making autonomy regarding antidepressant use.

To our knowledge this is the first report to describe and highlight a potentially important prospective association between objective measures of empathy and estimated medication adherence. Thus, we build on the report of Kim et al, who described cross-sectional correlations between patients' perceptions of clinicians' empathy and self-reported treatment adherence.[34] To support adherence to treatment recommendations, researchers recommend that clinicians learn at least 1 of 2 types of empathy. Surface, or cognitive, empathy may be improved by learning to vocalize more reflective statements,[35] whereas global assessment of emotional or deep empathy may be more challenging to improve.[36]

Limitations of our study include a small sample size (n = 63); however, the sample size was sufficient to confirm our primary hypothesis. The sample may not be representative of all patients with a new diagnosis of major depression and starting antidepressant medication, yet the RCT's systematic screening and recruitment process strengthens external validity. Other unmeasured and largely nonmodifiable factors that may affect medication adherence, particularly in a low-income safety net population, include financial and logistic barriers, medication beliefs, side effects, and lack of perceived efficacy.[37,38]

A strength of the study is that we accounted for primary adherence in overall PDC. Adherence studies often exclude patients who are primarily nonadherent, thereby biasing results by inflating PDC.[25]

Reliability scores for some MITI measures were lower than those in studies from specialty settings.[39] In this first description of MITI reliability obtained from primary care clinicians working in general health care settings, complex reflections and MIAs had low variability and mean scores across subjects, making it difficult to achieve a high reliability. Poor reliability can decrease the power to detect a significant effect,[40] so threat of a type I error was not increased. However, threat of a type I error would be increased somewhat because of multiple comparisons in this study.

Conclusions

Nonadherence to medication is a leading cause of preventable morbidity and mortality worldwide.[41] We have provided preliminary evidence of associations between novel clinician- and patient-level communication factors and subsequent adherence, in this case to antidepressant medication. However, it was not clear whether CT regarding antidepressant medication was modifiable. It would be important to investigate whether MI training that focuses specifically on improving those MI skills and global ratings that are associated with CT regarding antidepressant medication (eg, complex reflections, MI-adherent statements, and empathy) results in better adherence.

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Appendix 1

Inclusion/Exclusion Criteria

Patients meeting inclusion criteria for the parent study were English-speaking adults, aged 18 and older, who were beginning a new treatment episode for depression after screening positive for probable major depression with a PHQ-9[18] composite score $\geq$10 that was corroborated with a diagnosis of current major depressive disorder by the MINI diagnostic schedule.[42] Patients were excluded because of current alcohol or substance abuse, bipolar disorder, and/or current psychosis; medical or psychiatric treatment for depression within the previous 90 days; pregnancy or breastfeeding; homelessness; and no access to a personal telephone.

Antidepressant medications used in this study included the following:

- fluoxetine (Prozac)
- paroxetine (Paxil)
- citalopram (Celexa)
- sertraline (Zoloft)
- venlafaxine (Effexor)
- bupropion (Wellbutrin); Budeprion SR
- escitalopram (Lexapro)
- duloxetine (Cymbalta) (added to this list when the medication list was reviewed during the study)
- trazodone (Desyrel) when specifically prescribed for depression
- amitriptyline (Elavil) or other tricyclic medications when specifically prescribed for depression

Appendix 2

Motivational Interviewing (MI) Treatment Integrity Code

Code Categories	Components	Definition	Examples	Rating Scheme
MI-adherent statements	Affirm, emphasize autonomy, ask before giving advice, support		It takes courage to come in and talk about depression. (Affirm) May I share some information about antidepressant medications? (Ask permission)	
Simple reflections		Reflect basic understanding of what patient has said	You are determined to start an antidepressant medication.	
Complex reflections		Add substantial meaning to what patient has said	On the one hand you perceive potential benefit from the medicine, and on the other hand you are terrified of getting addicted.	
MI-consistent language	MI-adherent statements + reflections + open questions			
MI spirit		Average of global scores of evocation, collaboration, and autonomy/support		
Empathy		Global score: the extent to which the clinician understands or makes an effort to grasp the client's perspective and feelings. Reflective listening is an important part of this characteristic, but this global rating is intended to capture all efforts that the clinician makes to understand the client's perspective and convey that understanding to the client.		Empathy is evident when providers show an active interest in understanding what the client is saying. It can also be apparent when the clinician accurately follows or perceives a complex story or statement by the client or probes gently to gain clarity. Clinicians with low empathy show little effort to gain a deeper understanding of complex events and emotions, and questions asked reflect shallowness or impatience.
MI nonadherent statements	Advising, directing, confronting		I would strongly recommend that you start the antidepressant medication now. (Advise) You're letting your family down if you don't take the antidepressant. (Confront)	

Appendix 3

Interrater Reliability Summary

Methods

Interrater reliability between 2 raters from the MITI project was evaluated using a set of categorical and continuous measures. Interrater reliability was only measured between records that were evaluated or rated by both coders. There were a total of 77 records in the dataset. Of these, 75 records were evaluated by coder 1 and 77 by coder 2.

Global Measures

For the 4 global measures (global autonomy, collaboration, empathy, and evocation), interrater reliability was measured using Cohen κ statistic since the range of the measures was categorical (ie, 1–5). Before running the analysis, measures were recoded as a match if the measure between the raters differed by one increment. κ Statistics were then run for the recoded measures. A total of 73 records was evaluated by both coders and used in this portion of the analysis.

Continuous Measures

The ICC as described by Shrout et al[43] was used to measure interrater reliability for the continuous MITI measures: giving information, closed questions, open questions, complex reflections, simple reflections, MI-adherent statements, and MI-nonadherent statements. Summary scales included the sum of the simple and complex reflections (total reflections) and the aggregate total of the MI-consistent statements (eg, total reflections, open questions, and MIAs). The MI spirit reliability, an average of the global scales of collaboration, evocation, and autonomy, also was determined using the ICC. The ICC is based on summary statistics produced in a typical 2-way analysis of variance table. For this analysis, the analysis of variance model included rater and subject (ie, audio-recorded encounter). A total of 75 records were evaluated by both coders and used in this portion of the analysis. All analyses were done using SAS software version 9.2 (SAS, Inc.).

κ Coefficients: Global Measures

Global Measure	κ	*P**
Autonomy	0.7186	<.001
Collaboration	0.7187	<.001
Direction	0.6913	<.001
Empathy	0.7399	<.001
Evocation	0.6127	<.001

*Using normal approximation to test null hypothesis = no agreement.

Results: Global Measures

κ Coefficients indicated moderate to strong agreement between raters when they ranged from 0.6127 (global evocation) to 0.7399 (global empathy). For behavior counts, ICCs were more moderate, with most coefficients ranging between 0.34 (MI-adherent statements) and 0.76 (open questions). Notably, we saw poor correlation with regard to complex reflections (ICC, 0.18), which were more infrequent and are less defined in the literature.

Intraclass Correlation Coefficients (ICCs) for Behavior Counts

Measure	ICC
Give information	0.42
Closed questions	0.69
Open questions	0.76
Complex reflections	0.18
Simple reflections	0.58
Total reflections	0.54
MI-adherent statements	0.34
MI-nonadherent statements	0.45
Total statements consistent with MI	0.52
MI spirit	0.32

MI, motivational interviewing.