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### Publication Date

2019-04-01

### DOI

10.1016/j.jsat.2019.01.022

Peer reviewed



## An intervention to improve provider-patient interaction at methadone maintenance treatment in China<sup>☆</sup>



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### ARTICLE INFO

#### Keywords:

Provider-patient interaction  
Methadone maintenance therapy  
Service providers  
China

### ABSTRACT

**Background:** This study evaluated an intervention aiming to improve methadone maintenance therapy (MMT) service providers' interaction with their patients in China.

**Methods:** Sixty-eight MMT clinics were randomized to either an intervention or a control condition. Providers in the intervention group attended three group training sessions to enhance their communication skills. Trained providers were encouraged to practice the taught communication skills through provider-initiated individual sessions with their patients. A total of 418 service providers completed assessments from baseline to 24-month. Linear mixed-effects regression models were used to compare self-reported short-term and sustained improvement in provider-patient interaction between the intervention and the control conditions.

**Results:** The intervention group service providers perceived significantly greater short-term and sustained improvement in provider-patient interaction compared to the control group service providers (estimated difference (± SE): 1.20 (0.24) and 1.35 (0.33), respectively; p-values < 0.0001). Providers' baseline job satisfaction was significantly associated with a greater perceived improvement in provider-patient interaction for both periods (reg. coef. (± SE): 0.02 (0.01) and 0.04 (0.01) for short-term and sustained periods, respectively; p-values < 0.01).

**Conclusion:** Study findings suggest that the intervention could be beneficial for improving perceived provider-patient interaction in MMT programs. Service providers' job satisfaction should be addressed in training programs for the improvement of provider-patient interaction.

### 1. Introduction

In the healthcare field, patients' treatment outcomes are influenced not only by the effect of medication or medical technologies but also by the way healthcare services are delivered. Interpersonal relationships between service providers and patients have been increasingly recognized as an important determinant of care quality in recent years (Ha & Longnecker, 2010; Opper & Mohr, 2017). Provider-patient interaction includes several key characteristics such as provider' empathic attitude, trustful relationship, shared decision making, and effective communication (Murray & McCrone, 2015; Neumann et al., 2010), all of which have a positive impact on patients' service satisfaction, medication adherence, treatment progress, and clinical outcomes (Duggan & Thompson, 2011; Oetzl et al., 2015). In the addiction treatment

field, a sufficient and proper interaction between service provider and patients is even more crucial to ensure the quality of care and patient outcomes (Li et al., 2017; Li, Wu, Cao, & Zhang, 2012). In addition to decreased adherence and interrupted treatment attendance, lack of provider-patient communication in harm reduction services could even result in an increased risk of adverse events and patient harms (Paulozzi et al., 2009). In China, the rapid expansion of methadone maintenance therapy (MMT) programs calls for the effort to train service providers not only in the clinical administration of MMT but also in the effective delivery of comprehensive care (Li et al., 2013; Yin et al., 2010). Facing this challenge requires MMT providers to interact with patients effectively and empathically to engage them in a life-long substitution therapy (Li et al., 2012).

The provider-patient interaction was related to provider's

<sup>☆</sup> Clinical trial registration details

This trial was registered at [ClinicalTrials.gov](http://ClinicalTrials.gov).

Registration date: January 4, 2013. Identifier: NCT01760720

Link: <https://clinicaltrials.gov/ct2/show/NCT01760720>

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characteristics such as age, gender, personality type, cultural background, profession, working experience, and training (Cubaka, Schriver, Cotton, Nyirazinyoye, & Kallestrup, 2018; Li et al., 2012, 2017; Schouten & Meeuwesen, 2006). Previous studies in clinical settings reported that physician's workload, stress, and the associated burnout all have a negative impact on the quality of healthcare services (Dewa, Jacobs, Thanh, & Loong, 2014; Dewa, Loong, Bonato, & Trojanowski, 2017). In particular, service providers' level of job satisfaction was found to be correlated with the technical quality of consultation with HIV patients in resource-limited countries (Mutemwa et al., 2017). Balanced job satisfaction and workload are essential to service providers' performance and sustainability of the services (Chin-Quee et al., 2016; Fentiman, 2007; Winn et al., 2018). In addition, in treatment settings, the interaction between providers and patients is further complicated by service providers' moral beliefs and negative attitudes towards patients' drug-using behaviors. The negative attitude of providers towards their patients not only restrains them from actively communicating with their patients, but also diminishes the patients' desire to seek consultation and share their feelings (Lovi & Barr, 2009; Van Boekel, Brouwers, Van Weeghel, & Garretsen, 2013).

In China, MMT programs started with eight clinics in 2004 and expanded to 767 clinics serving 184,000 patients who use drugs by the end of 2014 (National Health and Family Planning Commission of the People's Republic of China, 2015; Pang et al., 2007). During the rapid scale-up of MMT programs, service providers face additional challenges associated with difficulties in lack of professional training, uncertainty of career advancement, concerns of personal safety, heavy workload, low income, and constraint of resources, which altogether lower their motivation and self-fulfillment at work (Li et al., 2013; Lin et al., 2010). The negative feelings about their job prevent them from communicating or interacting with their patients actively and result in loss of opportunity to provide timely counseling services (Li et al., 2013, 2017). Compared to other medical settings, a positive provider-patient relationship plays a more critical role in MMT programs due to the procedural nature of MMT that patients visit the clinics on a daily basis (Lin & Detels, 2011). There is an urgent need to address these challenges in MMT programs in China to ensure efficient provider-patient interaction and quality of service delivery.

Several intervention studies have sought to strengthen provider-patient interaction in general medical settings and demonstrated favorable outcomes in providers and patients (Alder, Christen, Zemp, & Bitzer, 2007; Brown, Boles, Mullooly, & Levinson, 1999; Dwamena et al., 2012; Harms et al., 2004; Heaven, Clegg, & Maguire, 2006; van Vliet et al., 2017). However, intervention research focusing on improving provider-patient interaction in addiction treatment settings is scarce. Our intervention training at the MMT clinics in China concentrated on providers' communication skills so that they become more confident to better interact with patients. In this study, we evaluated providers' perceived change in provider-patient interaction over a 2-year follow-up period. We also investigated the relationship between providers' job satisfaction and their perceived short-term and sustained improvement in provider-patient interaction.

## 2. Material and methods

### 2.1. Study design

Between March 2012 and December 2015, the study was conducted in 68 MMT clinics in five provinces (Sichuan, Guangdong, Hunan, Shaanxi, and Jiangsu) of China. The intervention trial, entitled *MMT CARE*, utilized a two-arm design. The participating clinics in each province were matched into pairs based on the number of patients and the affiliation of the clinic (hospital affiliated vs. CDC affiliated). In China, CDC affiliated MMT clinics and hospital affiliated clinics differ in funding resources and staff credentials (Lin et al., 2009). Therefore we considered clinic affiliation in matching to ensure comparability of the

clinics in the intervention and the control conditions. Each pair of clinics were randomized into either an intervention or a control condition after baseline assessment, which resulted in 34 clinics in each condition. The short-term and sustained perceived improvement in provider-patient interaction were evaluated at the 6-month follow-up and the end of the study, respectively. The study protocol and materials were approved by the Institutional Review Boards of the participating agencies in China and the United States. This trial was registered in the [ClinicalTrials.gov](http://ClinicalTrials.gov) protocol registration system (NCT01760720).

### 2.2. Participants

The study participants were MMT service providers, including doctors, nurses, counselors, and pharmacists working in MMT clinics. To be eligible for the study, service providers had to be aged 18 and above and currently providing direct medical services to patients in one of the participating MMT clinics (supporting staff, including security personnel, accountants, or cleaners, were excluded). We invited all eligible providers from the participating MMT clinics, usually five to seven members at each clinic. A project recruiter met with individual providers in the clinic to screen for eligibility. Potential provider participants were informed of the study through oral presentations given by the project recruiter. With a standardized script, the study purpose and procedures, voluntary participation, confidentiality issues, and other research ethics were elaborated. Written informed consents were obtained before data collection. A total of 418 service providers were recruited from the 68 MMT clinics.

### 2.3. The intervention

Service providers in the intervention condition participated in three group training sessions that occurred once a week for three consecutive weeks. Each session was about 90 min in length and conducted with a group of providers at each clinic. Intervention sessions focused on three themes: 1) reducing stigma and improving provider-patient relationships, 2) introducing effective communication skills and tools, and 3) applying the communication skills and tools with patients. Interactive stigma reduction games were played to reduce drug-related prejudicial attitudes and reinforce the principle of the equal right to healthcare. Several effective communication skills (such as reflective listening, rolling with resistance, and issue reframing), as well as simple communication tools (such as motivational ruler and decisional balance sheet), were introduced and demonstrated during the group sessions. The provider participants practiced these skills and tools through interactive group-learning activities, including role-play, pair-share, and discussions. When practicing the tools and skills, the providers were advised to pay attention to each patient's unique treatment needs and to involve patients in the process of medical decision-making. Upon completion of the intervention sessions, trained providers were encouraged to apply the taught communication skills and tools to individual sessions with their patients, with a focus to promote patients' positive behavioral changes and treatment adherence. To reinforce the intervention effort, reunions were conducted among intervention providers once every two months during the first year and once every four months during the second year. The reunion sessions provided the service providers with opportunities to share their experiences of applying the communication tools and skills and discuss challenges in engaging with patients and identify solutions. All intervention activities were delivered by local health educators in each province to ensure regional relevancy and sustainability.

Service providers in the control clinics continued to receive regular training on MMT-related policies, procedures, and side-effect management. One didactic lecture was offered to control condition service providers to emphasize the importance of appropriate methadone dosage.

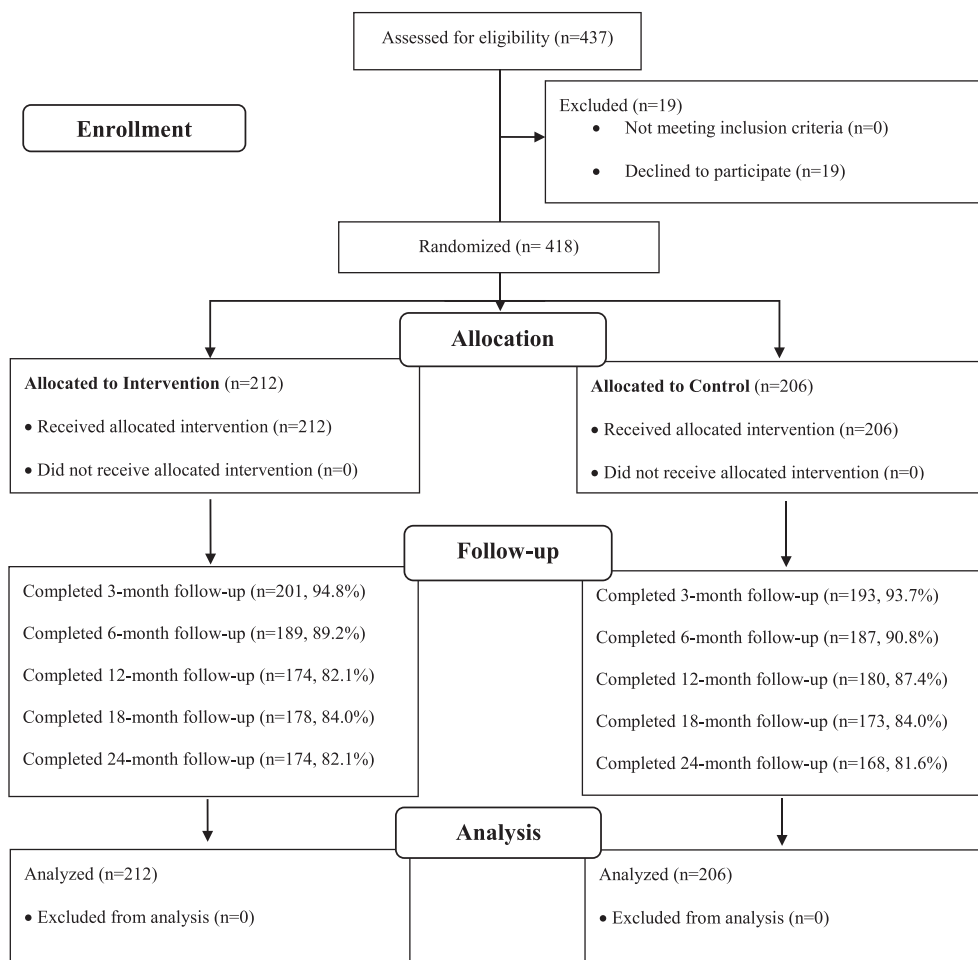


Fig. 1. Consort flow diagram.

#### 2.4. Data collection

At baseline (September 2012 and August 2013) and 3-, 6-, 12-, 18-, and 24-month follow-ups, service provider participants completed assessments using the computer-assisted self-interviewing method. The service providers read the survey questions on a computer screen and entered their responses directly into a computerized database. A study interviewer was on standby to assist in the assessment. All assessments were conducted in private offices within the participating MMT clinics. Each assessment lasted 45 to 60 min, and the participants received 30 yuan (U.S. \$5.00) for their time and effort. The 6-month follow-up rate was 89.8% in the intervention condition and 90.8% in the control condition. The rates were 82.1% and 81.6%, respectively, at the 24-month follow-up. Fig. 1 illustrates the follow-up rates at each assessment.

#### 2.5. Measures

Service providers' perceived *improvement in provider-patient interaction* was measured using five questions, developed specifically for this study to assess providers' perceived change in provider-patient interaction. At each follow-up visit, the providers were asked to evaluate their relationship and communication with their patients as compared to six months ago. The questions included: (1) how do you feel about the provider-patient relationship, (2) how comfortable do you feel in talking to your patients, (3) how confident do you feel in talking to your patients, (4) how often do you talk to your patients, and (5) how willing do you feel your patients are to talk to you. The response categories

were “worse,” “the same,” or “better” (Cronbach's alpha = 0.94).

For analysis purpose, *short-term improvement* and *sustained improvement* in provider-patient interaction were constructed based on the timing of the self-reports. For each question, providers were considered achieving short-term improvement if they self-reported being “better” during the first six months of follow-up. The sustained improvement was defined if a participant perceived being “better” for a particular question consecutively for one year after the 6-month follow-up (1 = improved and 0 = not improved). Because very few (18 out of 418) participants chose “worse” for any of the five questions during the follow-up period, the responses of “the same” and “worse” were combined as having achieved no improvement. The overall short-term and sustained improvement in provider-patient interaction scores were calculated by summing up the five individual questions (ranged from 0 to 5).

*Job satisfaction* was assessed using a 30-items scale developed by Bellingham (2004). It consists of four subscales including motivation, interaction with colleagues, work-life balance, and self-fulfillment. Likert-scale response categories for each item ranged from 1 = “strongly agree” to 5 = “strongly disagree.” With all the 30 questions being reversely coded, a summation score of job satisfaction was generated. A higher score indicates a higher level of job satisfaction (Cronbach's alpha = 0.94).

Providers' *demographic and career-related characteristics* were also collected at baseline, which included age, gender, profession (e.g., doctor, nurse, counselor, and pharmacist), length of working in the current MMT clinic (years), and whether they had received national-level MMT training (yes or no).

### 2.6. Statistical analysis

Descriptive statistics and frequencies of demographics, career-related characteristics, and baseline job satisfaction were summarized by intervention condition. Differences between intervention and control conditions in categorical (e.g., gender, profession) and continuous (e.g., age, length of working in the current MMT clinic, and job satisfaction) were compared using Chi-squared test and *t*-test, respectively.

We used linear mixed-effects regression models to compare the short-term and sustained improvement in provider-patient interaction between the intervention and control conditions. The covariates included in the models were intervention condition (intervention vs. control), age, gender, profession (doctor, nurse, and others), length of working in the current MMT clinic (< 2, 2–5 and > 5 years), received national level MMT training, and job satisfaction. Based on the previously identified association between job satisfaction and provider-patient interaction, we further conducted an exploratory analysis to examine whether the intervention effect on provider-patient interaction differed by providers' baseline level of job satisfaction. To do so, we categorized the job satisfaction score at baseline into quartiles: lowest quartile (Q1), second quartile (Q2), third quartile (Q3), and highest quartile (Q4). We then modeled providers' short-term and sustained improvement in provider-patient interaction separately using a linear mixed-effects regression model. The model included intervention condition, quartiles of job satisfaction score, and a two-way interaction of intervention condition by quartile. All the mixed-effects models included the clinic-level random effects to account for the multiple service providers within the same clinic. All statistical analyses were conducted using the SAS System version 9.4 (Cary, NC).

### 3. Results

The demographic, career-related characteristics and perceived job satisfaction at baseline of the 418 participants (212 in the intervention condition and 206 in the control condition) are summarized by study condition in Table 1. On average, providers in the intervention condition were younger than those in the control condition (38 vs. 41 years old, respectively; *p* = 0.03). Approximately 37% of the participants were men; 36% were doctors. The average years of working in the current MMT clinic was 3.8 years. Forty-eight percent of the participants had received national-level MMT training before baseline. None of these characteristics was significantly different between the two intervention conditions at baseline. Comparable levels of job satisfaction

**Table 1**  
Demographics and career-related characteristics.

	Intervention (N = 212)	Control (N = 206)	<i>p</i>
Age, N (%)			
35 years or less	99 (46.7)	72 (35.0)	
36–45 years	64 (30.2)	66 (32.0)	
> 45 years	49 (23.1)	68 (33.0)	
Mean (SD)	38.1 (11.1)	40.5 (10.7)	0.03
Male, N (%)	70 (33.0)	83 (40.3)	0.12
Profession, N (%)			
Doctor	75 (35.4)	76 (36.9)	0.60
Nurse	65 (30.7)	54 (26.2)	
Others (e.g., clinic manager/ pharmacist/counselor)	72 (34.0)	76 (36.9)	
Working in the current MMT clinic, N (%)			
< 2 years	61 (28.8)	51 (24.8)	
2–5 years	99 (46.7)	94 (45.6)	
> 5 years	52 (24.5)	61 (29.6)	
Mean (SD)	3.6 (2.1)	3.7 (2.2)	0.41
Received national-level MMT training, N (%)	110 (51.9)	91 (44.2)	0.11
Job satisfaction, Mean (SD)	110 (13.6)	110 (14.1)	0.70

at baseline between intervention and control were also observed.

Table 2 presents the mixed-effects regression results for providers' short-term and sustained improvement in perceived provider-patient interaction. Comparing to the providers in the control condition, the providers in the intervention condition reported a significantly greater short-term improvement in provider-patient interaction (estimated mean score: 4.25 vs. 3.05 for intervention and control, respectively; difference = 1.20, SE = 0.24, *p* < 0.0001). The intervention providers also reported a significantly higher level of sustained perceived improvement in provider-patient interaction compared to those in the control condition (estimated mean score: 2.78 vs. 1.43 for intervention and control, respectively; difference = 1.35, SE = 0.33, *p* < 0.0001). Also, we observed that providers' baseline job satisfaction was positively associated with a higher perceived improvement in provider-patient interaction for the short-term and sustained periods (coefficient (SE): 0.02 (0.01) and 0.04 (0.01), respectively, *p*-values < 0.01).

When we further explored the relationship between providers' baseline job satisfaction and perceived improvement in provider-patient interaction, we found the relationship for the short-term and sustained improvement in perceived provider-patient interaction varied. Fig. 2A shows the estimated means of perceived short-term improvement score by quartiles of providers' job satisfaction. The average perceived short-term improvement score reported by the intervention providers was at least 4.0 for all levels of their baseline job satisfaction, and these scores were significantly higher than control providers' regardless the level of baseline job satisfaction (*p* < 0.05). Fig. 2B presents the estimated mean score of sustained perceived improvement by quartile of providers' baseline job satisfaction. The difference in sustained perceived improvement score became greater as the level of job satisfaction increased (*p* < 0.0001 for Q2 to Q4), suggesting that intervention providers were able to continue their improvement in provider-patient interaction when they had a higher level of job satisfaction at baseline (difference: 0.63 vs. 1.89 for Q1 vs. Q4, respectively; *p* = 0.028).

### 4. Discussion

The MMT CARE intervention has shown improvement in provider-patient interaction from the providers' perspective. The perceived improvement was indicated by a range of measures relating to providers' reports on overall relationship with patients, their comfort and confidence level interacting with patients, the frequency of communication, as well as patients' willingness to communicate with them. These changes, although based on providers' self-report, could be reflected in their actual communication behaviors with patients during clinical encounters (Jenkins & Fallowfield, 2002; Zill et al., 2014), as well as patients' service satisfaction (Campbell, Lockyer, Laidlaw, & MacLeod, 2007). The study findings have implications for the skill building of MMT service providers. First, drug-using behavior is considered to be contradictory to the social value in the Chinese culture (Tang, Zhao, Zhao, & Cubells, 2006). MMT providers' negative attitude towards their patients has greatly hindered their motivation to interact with their patients (Li et al., 2012). Therefore, the intervention incorporated stigma-reduction components as the vital first step so that the providers would be willing to interact with the MMT patients in a non-prejudicial manner. Second, there is an inadvertent power imbalance between service providers and their patients in most harm reduction service settings, where the patients are often excluded from discussions about their healthcare planning and treatment options (Korthuis et al., 2010). This intervention promoted the concept of patient-centered care in MMT service delivery (Barry & Edgman-Levitan, 2012; Dwamena et al., 2012). Providers were asked to shift their focus away from substance use disorder as a disease and pay more attention to patients' perspectives and needs. The involvement of patients in treatment procedure and decision-making could enhance a sense of empathy and partnership between the MMT providers and their patients (Barry & Edgman-

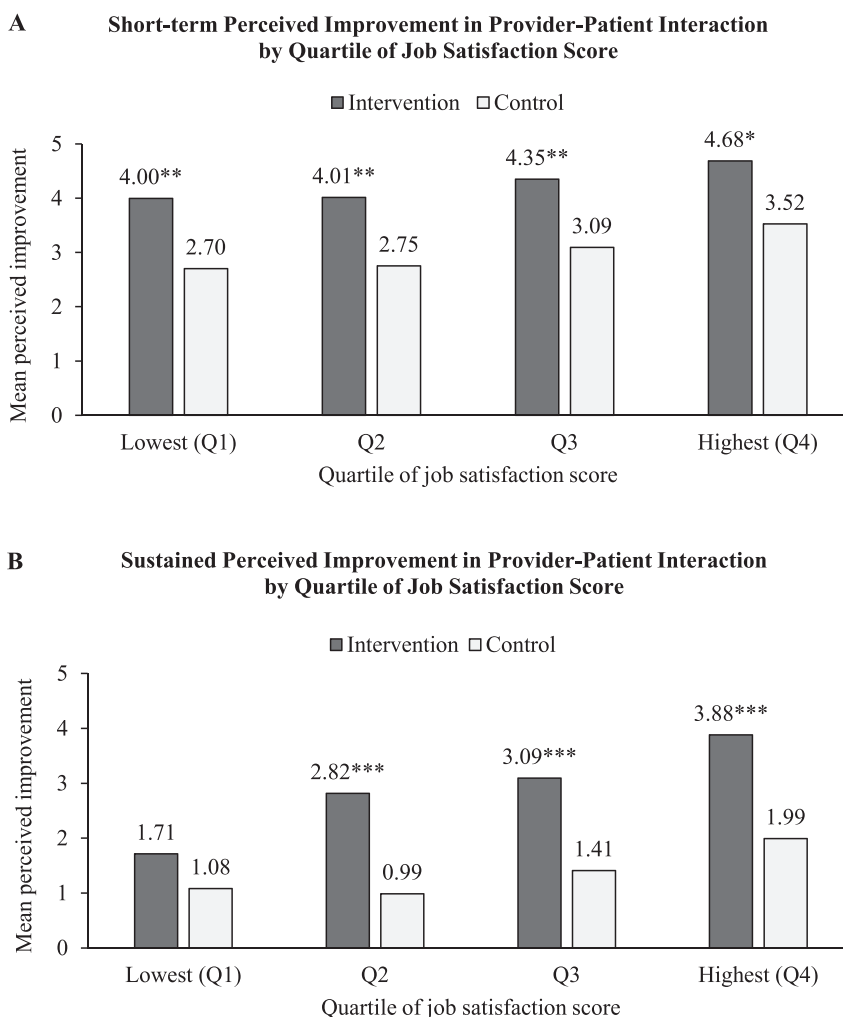
**Table 2**  
Linear mixed-effects regressions on short-term and sustained improvement in perceived provider-patient interaction.

	Short-term improvement score		Sustained improvement score	
	Estimate (SE)	p	Estimate (SE)	p
Intervention effect (intervention – control)	1.20 (0.24)	< 0.0001	1.35 (0.33)	< 0.0001
Age (REF: > 45 years)				
35 years or less	–0.26 (0.21)	0.23	–0.04 (0.25)	0.87
36–45 years	0.23 (0.23)	0.31	0.34 (0.27)	0.21
Male	–0.03 (0.20)	0.87	0.10 (0.23)	0.67
Profession (REF: others)				
Doctor	–0.04 (0.21)	0.84	–0.14 (0.24)	0.56
Nurse	–0.05 (0.23)	0.82	–0.07 (0.27)	0.81
Working in the current MMT clinic (REF: > 5 years)				
< 2 years	0.28 (0.27)	0.29	–0.07 (0.32)	0.81
2–5 years	0.20 (0.23)	0.37	0.24 (0.27)	0.37
Received national-level MMT training	–0.10 (0.18)	0.60	–0.34 (0.21)	0.11
Job satisfaction	0.02 (0.01)	0.003	0.04 (0.01)	< 0.0001

Levitan, 2012). Third, the standardized and straightforward communication tools taught in the intervention could be used to tackle a variety of common issues during MMT, including clarifying misconceptions regarding methadone medication, discussing methadone dosage, reducing concurrent drug use, and preventing treatment drop-outs. The providers could utilize these tools and skills to constructively and effectively convey their messages in both counseling sessions and

informal clinical encounters, without adding excessive burden to their current workload. These concepts and practical tools/skills taught in the MMT CARE intervention can serve as a beneficial supplement to the current MMT service provider training curriculum in China (Li et al., 2013).

Most previous studies on service provider training have only measured trainees' performance for up to 12 months after training,



**Fig. 2.** Short-term and sustained perceived improvement in provider-patient interaction by quartile of job satisfaction score among all providers. \*p-value < 0.05; \*\*p-value < 0.001; \*\*\*p-value < 0.0001.

revealing limited information about the stability of long-term improvement (Dunn et al., 2016). This study contributes to the literature by monitoring the consistency of perceived improvement through multiple observations throughout two years. In this study, the providers reported desirable enhancement in provider-patient interaction within six months of follow-up. More favorably, the perceived improvement maintained throughout the two years. Given the brevity of the intervention, we consider the sustained improvement to be accomplished through a combination of real-life practice and continued support. As noted previously, the trained providers were encouraged to apply the learned communication tools in multiple individual sessions with their patients. The repeated deliberate practice might have led to more fine-tuned communication skills and a higher comfort level interacting with patients over time. The experiences of conducting individual sessions were shared during regular reunion sessions, where both trainers and peers provide specific feedback and suggestions. The reunions formed a platform to foster continued skill-building, problem-solving, and technical support, which preserved the intervention outcomes.

We found that providers with a higher level of job satisfaction showed benefit from the intervention when it came to achieving sustained improvement in provider-patient interaction. This finding is consistent with previous study findings that service providers who were satisfied with their job had better working performance than their counterparts (Jabbari, Pezeshki, Naghavi-Behzad, Asghari, & Bakhshian, 2014). Working in addiction treatment settings could be a stressful experience, which is correlated with emotional exhaustion and burnout (Shoptaw, Stein, & Rawson, 2000). Providers' lack of job satisfaction could hamper their willingness to learn new skills through in-service training or spend time interacting with patients (Bellingham, 2004; Witt, 2017; Wright-Brown, Sekula, Gillespie, & Zoucha, 2016). Future skill-building efforts in MMT settings could further rectify unfavorable organizational culture and ensure sufficient institutional support to promote job satisfaction in providers to facilitate the adoption of innovations and maintain the training effects (Lavoie-Tremblay et al., 2008; Pinto et al., 2018).

There are some limitations in interpreting this study's findings. First, the self-reported data of improvement in provider-patient interaction could be biased due to social desirability. Second, since self-reported measures were used to evaluate both job satisfaction and improvement in provider-patient interaction, it is possible that those who were more satisfied with their jobs might tend to express positive feelings of interaction with patients. More objective measures of the provider's frequency and quality of communication with patients and evaluations from patients' perspective should be explored in future studies.

## 5. Conclusions

In conclusion, this study suggested that intervention training targeting MMT providers' communication skills is promising for the improvement in both short-term and sustained interaction between providers and their patients. Future training programs for provider-patient interaction should pay more attention to provider' job satisfaction. Providers with a lower level of job satisfaction need additional training and support to achieve improvement in the targeted skill sets, especially in an effort to accomplish sustained skill building.

## Declarations of interest

None.

## Funding

This work was supported by the National Institute on Drug Abuse of the National Institutes of Health [award numbers R01DA033130] and the National Institute of Mental Health of the National Institutes of Health [award number P30MH058107].

## Acknowledgments

The authors gratefully acknowledge the project team members in China for their contributions to this study. The authors also thank Dr. Chiao-Wen Lan for her involvement in the early stage of manuscript development.

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