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Resilience associated with mental health problems among methadone maintenance treatment patients in Guangzhou, China

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Abstract

A considerable proportion of methadone maintenance treatment (MMT) clients have experienced mental health problems (e.g., depression and anxiety), and poor mental health status is associated with HIV-related risk behaviors and treatment drop-out. Resilience is known to be a protective factor for mental health problems but is not studied among MMT clients in China. This study aimed to explore the relationship between resilience and mental health problems (depression, anxiety and stress) among clients of community-based MMT clinics in China. A total of 208 MMT clients completed the face-to-face interview conducted at four of eleven MMT clinics in Guangzhou. The Chinese short version of Depression Anxiety Stress Scale (DASS-21) was used to assess the presence of depressive, anxiety and stress symptoms, and the Connor-Davidson Resilience Scale (CD-RISC) was used to measure resilience. Logistic regression models were fit in data analyses. Of all participants, 12.8 percent, 19.5 percent and 8.3 percent had depression, anxiety and stress respectively. The mean resilience score was 57.6 (SD=15.9). In the univariate analyses, resilience was negatively associated with two studied mental health problems (depression and anxiety, $OR_u=0.96$ and 0.96 , $p<0.01$). In multivariate models adjusting for both background and other psycho-social factors, resilience was independently associated with probable depression ($OR_a=0.97$, 95% CI: 0.93–0.99) and anxiety ($OR_a=0.96$, 95% CI: 0.94–0.99). Resilience was independently associated with depression and anxiety. As resilience is changeable, interventions targeting mental health problems of MMT users should consider resilience as an important part in the designing of such interventions.

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Declaration of interest

There is no conflict of interests of all authors.

Keywords

methadone maintenance treatment; resilience; mental health; China

1 Introduction

Drug use remains a significant problem in China. There were an estimated 2,475,000 drug users as of 2013, of whom 53.6 percent were addicted to heroin (Zhang. & Chin., 2015). Methadone maintenance therapy (MMT) is an effective and evidence-based approach for the treatment of heroin addiction (Judd et al., 1998). Since 2004, China has developed more than 700 community-based MMT clinics in 28 provinces, treating more than 384,500 heroin users by the end of 2012 (Yin et al., 2015).

Despite the successful implementation of the MMT program in China, there is extensive evidence that a considerable proportion of MMT clients are experiencing mental health problems such as depression and anxiety (Gao, Cheng, Ding, Pan, & Wang, 2009; Liu, Wang, Zhang, & Zhou, 2011; Tian, Feng, Li, Peng, & Hou, 2009; Yin et al., 2015). Mental health problems are strongly associated with MMT drop-out and HIV-related risk behaviors (Gu, Xu, et al., 2014; Voon et al., 2015; Yin et al., 2015). As mental health care for MMT clients in China is very limited, understanding factors associated with mental health problems, especially identifying changeable factors, would contribute to the design of mental health services targeting MMT clients' psychological wellbeing.

Resilience receives much attention in research recently and it refers to how well one bounces back from adversity. Resilience is a process during which people could develop coping techniques (Klohn, 1996), and it has been proven to be a protective factor against mental health problems such as depression (Roisman, 2005; Werner, 1989). Research findings also support the usefulness of the concept of resilience in understanding cognitive and behavioral change among illicit drug users (Stajduhar, Funk, Shaw, Bottorff, & Johnson, 2009). However, so far very few studies have investigated resilience among drug users, and no study investigated resilience and its association with mental health status among MMT clients.

The purpose of this study was to explore the prevalence of mental health problems (depression, anxiety and stress) and relationships between psycho-social factors (especially resilience) and mental health problems among patients in community-based MMT clinics in Guangzhou. We further tested the hypothesis that resilience would be independently associated with mental health problems after adjusting for background confounders and other psycho-social variables.

2 Method

2.1 Study design

The study was conducted at four out of eleven MMT clinics in Guangzhou, which is the largest city in South China with a population of 12.7 million and 68,000 estimated heroin users. The first MMT clinic was established in 2006, and a total of 11 clinics covered all

districts of Guangzhou by the end of 2010. Participants of the study were registered MMT users of the selected clinics, at least 18 years of age who gave informed consent to participate in the study. A total of 220 MMT users were invited to join in the study, of whom 208 (94.5%) agreed and completed the face-to-face interview. The study was approved by the Ethics Committee of School of Public Health, Sun Yat-sen University.

2.2 Measures

Information on participants' socio-demographic characteristics and drug use history was collected (Table 1). The Chinese short version of Depression Anxiety Stress Scale (DASS-21) was used to assess the presence of probable *depression*, *anxiety* and *stress* by three 7-item subscales (Chan et al., 2012). Scores of cut-off points of normal cases, mild, moderate, severe and extremely severe depression/anxiety/stress were applied according to literature (Lyvers, Carpio, Bothma, & Edwards, 2013). Participants with severe/extremely severe levels of scores were defined as with probable mental health problems. The 25-item validated Connor-Davidson Resilience Scale (CD-RISC) was used to measure *resilience* (Connor & Davidson, 2003). The total score ranges from 0 to 100, with a higher score reflecting a higher level of resilience (Cronbach's $\alpha = 0.92$). *Hopelessness* was measured by one item 'My future seems dark to me' from the Chinese Hopelessness Scale (Aish, Wasserman, & Renberg, 2001). *Satisfaction with life* was measured by the question 'In most ways my life is close to my ideal' from the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). *Perceived social support* was measured by a 4-item Social Support Scale, which was validated in our previous study on drug users (Gu et al., 2010) (Cronbach's $\alpha=0.72$).

2.3 Statistical analysis

Three sets of logistic regression models were conducted. Model 1: univariate models to identify the associations between all studied variables and the three mental health outcomes. Model 2: adjusted models to exam the associations between each psycho-social factor and the three outcomes, adjusting for background confounders with $p<0.1$ in univariate analysis. Model 3: adjusted models to exam the independent association between resilience and mental health outcomes, adjusting for background variables with $p<0.1$ and other psycho-social variables with $p<0.1$. All data analyses were performed by statistical software R version 3.1.1.

3. Results

Profiles of all participants were summarized in Table 1. Of all participants, 12.8 percent, 19.5 percent and 8.3 percent had probable depression, anxiety and stress respectively.

The associations between background factors and mental health outcomes are shown in Table 2. In univariate analysis (Model 1, Table 3), all studied psycho-social variables were significantly associated with depression; all but one (social support) were significantly associated with anxiety; and social support was significantly associated with stress. Almost all significance remained after adjusting for potential background confounders (Model 2, Table 3). In Model 3, after adjusting for both background confounders and other psycho-

social factors, resilience was independently negatively associated with probable depression (adjusted odds ratio [OR_a]=0.97, 95% confidence interval [CI]: 0.93–0.99) and anxiety (OR_a=0.96, 95% CI: 0.94–0.99).

4. Discussion

The main finding of this study showed that resilience was independently associated with depression and anxiety after adjusting for background confounders and other psycho-social variables, as was expected, and the result is consistent with previous studies conducted among the other populations (Werner, 1989; Yoshikawa, Nishi, & Matsuoka, 2015). The prevalence of mental health problems in our study was relatively lower than that of studies among drug users (Gu, Lau, et al., 2014), but is similar to that of drug users using MMT (Liu et al., 2011; Yin et al., 2015). It is possible that MMT may improve drug users' mental health status by reducing the pressure of seeking illegal drugs (Savvas, Somogyi, & White, 2012).

Resilience is a fluid, dynamic and interactive process (Stajduhar et al., 2009). According to resiliency model, humanity begin at a point of bio-psycho-spiritual balance, ineffective adaptations for adversity give rise to disruption of this balance. Different responses to this disruption lead to different outcomes, including resilience increasing, a return to baseline balance and a lower level of resilience (Richardson, 2002). Highly resilient individuals have the psychological capacity to rebound from negative circumstances and are more likely to find positive meaning in their negative circumstances, which promotes positive emotions (Ramanaiah, Sharpe, & Byravan, 1999; Richardson, 2002; Stajduhar et al., 2009).

For MMT clients, the history of addiction resulted in disruption of the bio-psycho-spiritual balance, and they might be recovery with loss, establishing a lower level of resilience. The poor status of resilience aggravates the mental problems of MMT users. Such was supported by our finding of independent relationship between resilience and depression/anxiety. But the association between resilience and stress was not found. It could be partially explained by the relatively low prevalence of severe stress in our study. On the other hand, MMT clients might be bounces back from adversity successfully during therapy which resulted in the lower level of stress, but that does not mean that they can overcome all the adversities in the future, and researchers also need to focus on these questions. Furthermore, although the stress level of MMT users is relatively low, MMT clients may experience numerous negative events. These findings help us understand the model of how resilience influences mental health, and reminds us that resilience plays an important role in protecting mental health among MMT clients.

Mental health problems should be treated quickly because they may lead to serious consequences (Lu, Frank, Liu, & Shen, 2009; Toli, Webb, & Hardy, 2015). Given the great shortage of psychiatrists (only about 4,000 fully qualified psychiatrists in the whole country) and under-development in clinical psychology in China (Xiang, Yu, Sartorius, Ungvari, & Chiu, 2012), the availability of mental health care for drug users is very limited (Gu et al., 2010). For MMT clients, some simple, effective psychological interventions should be carried out and MMT clinics can be an ideal platform for such interventions. In light of

variability of resilience and influencing factors of resilience (Connor & Davidson, 2003), mental health service could be provided by methadone treatment clinics, like construction of positive appraisal styles, trainings on making and following through with realistic plans, and activities about learning positive coping strategies, in order to enhance resilience.

There are some limitations in this study. First, the study was conducted in one city and we might not be able to generalize the findings to other MMT clients in China. Second, temporal sequence of variables can't be derived based on the findings due to the nature of the cross-sectional study design. Third, data were self-reported and reporting bias may exist. Fourth, longer-term effects should be assessed.

This study was the first one to explore the relationship between resilience and mental health problems among clients of community-based MMT clinics in China. Taking many confounding factors into consideration, we prove that resilience was independently associated with depression and anxiety. As resilience is changeable, interventions targeting mental health problems of MMT clients should consider resilience as an important part in the design of such interventions.

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Table 1

Profiles of all participants (n=208)

	n	%
<u>Socio-demographic characteristics</u>		
Sex		
Male	192	92.7
Female	15	7.3
Age group		
<35	33	16.2
35~	131	64.2
45~	40	19.6
Ethnicity		
Han	205	99.0
Other	2	1.0
Education level		
Primary or below	44	21.2
Junior high	130	62.8
Senior high or above	33	16.0
Current marital status		
Single	46	22.4
Married or cohabitation	130	63.4
Divorced or other	29	14.2
Current employment status		
No	115	55.6
Yes (full-time or part-time)	92	44.4
Years of participating in MMT		
<3	161	77.4
3~	47	22.6
<u>Drug use history</u>		
Age of first drug use		
20	85	41.1
21~	107	51.7
31~	15	7.2
Duration of drug use (years)		
10	24	11.8
11~20	113	55.4
21~	67	32.9
Number of times of compulsory drug detoxification		
0	25	12.0
1~2	134	63.4
3~	49	23.6
Current drug use		

	n	%
No	154	75.1
Yes	51	24.9
<u>Psycho-social status</u>		
Hopelessness ('my future seems dark to me')		
Strongly disagree/Disagree/Somewhat disagree	133	64.3
Somewhat agree/Agree/Strongly agree	74	35.7
Satisfaction with life ('my life is close to my ideal')		
Strongly disagree/Disagree/Somewhat disagree	111	53.6
Somewhat agree/Agree/Strongly agree	96	46.4
Perceived social support (Mean, SD)	(2.1	1.3)
Substantial support from family members		
No support/Little support	63	30.4
Some support/Much support	144	69.6
Substantial support from friends		
No support/Little support	136	65.7
Some support/Much support	71	34.3
Psychological support from family members		
No support/Little support	91	44.0
Some support/Much support	116	56.0
Psychological support from friends		
No support/Little support	106	51.2
Some support/Much support	101	48.8
Resilience (Mean, SD)	(57.6	15.9)
Depression (Mean, SD)	(9.0	9.0)
Normal/Mild/Moderate	177	87.2
Severe/Extremely Severe	26	12.8
Anxiety (Mean, SD)	(8.9	7.1)
Normal/Mild/Moderate	165	80.5
Severe/Extremely Severe	40	19.5
Stress (Mean, SD)	(9.6	8.7)
Normal/Mild/Moderate	188	91.7
Severe/Extremely Severe	17	8.3

Table 2
Associations between background factors and mental health outcomes (univariate analyses)^a

	Depression		Anxiety		Stress	
	%	OR _u (95% CI)	%	OR _u (95% CI)	%	OR _u (95% CI)
<u>Socio-demographic status</u>						
Age group						
<35	6.1	1.00	18.2	1.00	3.0	1.00
35~	11.5	1.88(0.57–11.52)	16.8	0.93(0.36–2.71)	7.6	2.69(0.48–50.31)
45~	22.5	3.60(1.02–22.55) ⁺	25.0	1.55(0.51–5.11)	15.0	5.82(0.92–93.41)
Education level						
Primary or below	18.2	1.00	29.5	1.00	13.6	1.00
Junior high	10.0	0.50(0.20–1.36)	14.6	0.40(0.18–0.92)[*]	6.9	0.47(0.16–1.47)
Senior high or above	15.2	0.78(0.22–2.61)	21.2	0.62(0.21–1.75)	6.1	0.40(0.06–1.87)
Current marital status						
Single	19.6	1.00	19.6	1.00	8.7	1.00
Married or cohabitation	8.5	0.39(0.15–1.04) ⁺	16.9	0.85(0.37–2.10)	7.7	0.86(0.27–3.27)
Divorced or other	20.7	1.12(0.34–3.54)	27.6	1.64(0.54–4.97)	10.3	1.23(0.23–6.03)
Current employment status						
No	6.1	1.00	9.6	1.00	5.2	1.00
Yes (full-time or part-time)	20.7	3.24(1.49–8.00)^{**}	30.4	3.16(1.72–6.31)^{***}	12.0	2.32(0.92–6.52) ⁺
<u>Drug use history</u>						
Duration of drug use (years)						
<11	4.2	1.00	12.5	1.00	0.0	1.00
11~	8.0	1.98(0.39–35.72)	20.4	1.64(0.64–6.53)	5.3	Inf (NA)
21~	23.9	5.82(1.30–102.22) ⁺	17.9	1.48(0.52–6.01)	16.4	Inf (NA)
Number of times of compulsory drug detoxification (years)						
0	4.0	1.00	8.0	1.00	4.0	1.00
1–2	11.2	2.97(0.56–55.13)	20.1	2.80(0.76–18.16)	6.7	1.67(0.29–31.5)
3~	20.4	6.05(1.05–114.71) ⁺	22.4	3.27(0.78–22.41)	14.3	3.92(0.64–75.8)

^a; factors with $p>0.1$ in analysis with all three outcome variables were not listed in the table, including: sex, ethnicity, years of participating in MMT, age of first drug use and current drug use.

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OR_U: Odds ratios of univariate logistic regression models.
NA: Not applicable.

$\neq$ $p<0.1$;
* $p<0.05$;
** $p<0.01$;
*** $p<0.001$.

ORs and 95% CIs with $p<0.05$ were in bold.

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Table 3

Associations between psycho-social factors and mental health outcomes

	Depression			Anxiety			Stress		
	Model 1 OR _n (95% CI)	Model 2 OR _n (95% CI)	Model 3 OR _n (95% CI)	Model 1 OR _n (95% CI)	Model 2 OR _n (95% CI)	Model 3 OR _n (95% CI)	Model 1 OR _n (95% CI)	Model 2 OR _n (95% CI)	Model 3 OR _n (95% CI)
<u>Hopelessness</u>									
Strongly disagree/Disagree/Somewhat disagree	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	N.A.
Somewhat agree/Agree/Strongly agree	5.72 (2.55–15.13)***	4.73 (1.73–14.50)**	2.79 (0.91–9.45) ⁺	3.29 (1.87–6.10)***	3.95 (1.81–8.96)***	2.93 (1.25–7.08)*	1.99 (0.79–5.10)	1.67 (0.58–4.87)	
<u>Satisfaction with life</u>									
Strongly disagree/Disagree/Somewhat disagree	1.00	1.00	1.00	1.00	1.00	N.A.	1.00	1.00	N.A.
Somewhat agree/Agree/Strongly agree	0.29 (0.10–0.69)**	0.35 (0.10–0.99) ⁺	0.67 (0.19–2.27)	0.50 (0.26–0.90)*	0.59 (0.26–1.28)		0.36 (0.10–0.97) ⁺	0.39 (0.10–1.18)	
<u>Perceived social support</u>									
Scale score of Perceived Social Support	0.76 (0.65–0.89)***	0.75 (0.62–0.90)**	0.81 (0.66–0.97)*	0.90 (0.80–1.02)	0.93 (0.82–1.07)	N.A	0.74 (0.60–0.88)**	0.73 (0.60–0.88)**	0.74 (0.60–0.89)**
<u>Resilience</u>	0.96 (0.93–0.98)**	0.95 (0.92–0.98)**	0.97 (0.93–0.99)*	0.96 (0.94–0.98)***	0.96 (0.93–0.98)***	0.96 (0.94–0.99)**	0.99 (0.96–1.03)	0.99 (0.96–1.02)	1.00 (0.96–1.03)

Model 1: univariate models to identify the associations between each psycho-social factor and the three mental health outcomes.

Model 2: adjusted models to exam the associations between each psycho-social factor and outcomes, adjusting for background confounders with *p*<0.1 in univariate analysis (Table 2).

Model 3: adjusted models to exam the independent associations between resilience and mental health outcomes, adjusting for background variables with *p*<0.1 (Table 2) and other psycho-social variables with *p*<0.1 in Model 2.

OR_U: Odds rattions of univariate logistic regression models.

OR_{aj}: Odds rattions of adjusted logistic regression models.

N.A.: Not applicable

⁺ *p*<0.1;

^{*} *p*<0.05;

^{**} *p*<0.01;

^{***} *p*<0.001.

ORs and 95% CIs with *p*<0.05 were in bold.