Using Mental Health Screening Instruments for Understanding Depression and Personality Profiles among Chinese transgender individuals

Abstract

This study assessed the depression status of transgender individuals, and also their personality profiles for seeing the psychological functioning. We further compared their status with cisgender individuals and explored the role of personality profiles in explaining the variance of depression level among transgender and cisgender individuals. Seventy-one transgender individuals and seventy-three cisgender individuals were investigated in Shanghai Mental Health Centre. The general depression level and personality profiles of transgender individuals remained normative range, but percentages of transgender individuals who reported moderate or major symptoms and poor personality profiles were significantly higher than those of cisgender counterparts. Subscale scores of paranoia and psychopathic deviate significantly contributed to the variance of depression level among transgender people in multiple regression model. This study sheds light on the psychological needs of transgender people, which provided healthcare providers the implications of developing psychological intervention programs and mental health services.

本研究探讨了跨性别者的抑郁状态，并通过测量人格特征来看他们的心理功能。研究也将他们的状态与顺性恋者的抑郁水平及心理功能进行比较，并研究了在跨性别者中人格特征在解释抑郁水平变化中的作用。本研究在上海市精神卫生中心调查了 71 名跨性别者及 73 名顺性恋者。跨性别者人群的整体抑郁水平和人格特征在正常水平范围之内，但是他们有中到重度抑郁症状和不良人格特征的人群占比显著高于对照组。在多元回归模型中，妄想和病态分量表分数显著的解释了跨性别者抑郁水平的变化。本研究阐述了跨性别群体的心理需求，为医疗服务者发展相关的心理干预项目提供了启示。

Keywords: Depression, psychological functioning, personality profiles, mental health screening, Chinese transgender individuals

Introduction

Transgender is an umbrella term refers to those who do not identify themselves with the gender assigned at birth as opposed to cisgender individuals (Ansara and Hegarty 2012). There exits incongruence between sex assigned-at-birth and self-awareness of their own gender among transgender people. Their gender identity or expression differs from the culture of society, which supposes that the behaviours related to gender should be consistent with one's sex assigned at birth (Davidson 2007; Valentine 2007). As stated in the fifth edition of the Diagnostic and Statistical Manual (DSM-V), "gender dysphoria" is used to describe transgender individuals. It points out the distress may "accompany the incongruence between one's experienced or expressed gender and one's assigned gender" (American Psychiatric Association 2013, 451). Faced with the distress, some transgender individuals intend to endorse themselves into sex-reassignment treatment, and some others represent themselves out of the scope of the traditional gender binary (i.e. male or female) (Davidson 2007). Whether taking a lengthy sex-reassignment treatment, or a way of gender expression that is different from the general public in society, transgender people are more likely to be regarded as deviant by society, which will further negatively influence their psychological outcomes.

Transgender individuals may experience adverse mental health outcomes due to the stressful environments and negative responses related to their gender identity (Hendricks and Testa 2012). A critical review of transgender people demonstrated that transgender individuals experience depression, anxiety, substance use, and so forth under the influence of stress over their life-course (White Hughto, Reisner, and Pachankis 2015). Among the mental health outcomes, depression is a serious public health issue, and it is also a common chronic mental health condition for lesbian, gay, bisexual, and transgender (LGBT) persons (Penzak, Reddy, and Grimsley 2000). Especially in transgender individuals, the depression level of them can be higher than that of the general

public (Kessler et al. 2005). According to literature, the rate of depression among the transgender population can be as high as 62% compared with the general public whose prevalence of lifetime depression is 16.6% (Kessler et al. 2005; Budge, Adelson, and Howard 2013). Based on the high rate of depression in this group of people, an overview summarized fourteen studies of their depression status and pointed out that their minority stress, avoidant coping such as substance use, and gender-based rejection were associated with the increased risk of depression (Hoffman 2014). Besides, depression can have adverse impacts as well. Under vulnerable situation, individuals with depressive symptoms may suffer greater pain and be unwilling to seek medical assistance, which can be detrimental to their quality of life (Pinquart and Duberstein 2010).

According to the precursor model, personality is associated with depression and it can contribute to the onset and course of depression. Personality refers to the personal characteristics in emotion and its regulation, which are biological-based, early-emerging (Klein, Kotov, and Bufferd 2011). Personality profiles can be gradually stable over the lifespan that reflects the psychological functioning of individuals, which also means that personality profiles are the dynamic constructs influenced by the life circumstances (Compas et al. 2001; Fraley and Roberts 2005). The precursor model pointed out that personality profiles and depression can have similar etiological factors but the personality profiles are prior to the onset of depression (Klein, Kotov, and Bufferd 2011). That is, personality profiles are considered as early manifestations of depression. This model assumes the personality profiles are related to depression and the individuals with a high level of some personality profiles might be at higher risk of developing depression.

On the basis of the precursor model, some personality profiles have been documented to be associated with depression. According to the meta-analysis of 175 studies published from 1890 to 2007 (Kotov, Gamez, Schmidt, and Watson 2010), the

major depressive disorder of the general public was associated with a high level of extraversion/positive emotionality (d=1.33) and a low level of conscientiousness (d=-0.90). Clark, Watson, and Mineka (1994) pointed out that a low level of extraversion/positive emotionality might also be the early manifestations of depressive disorders. Kendler and Myers (2010) conducted series of research based on big data of twin adults, and they found consistent results that neuroticism was strongly associated with major depression and a weak association was found between extroversion and major depression. Temperamental aspects of personality such as harm avoidance, persistence, and novelty-seeking, are also related to the depression level (Grucza et al. 2003). In Asia, Sakado et al. (2000) concentrated on interpersonal sensitivity, and they found that a high level of interpersonal sensitivity increased the risk of lifetime depression. For transgender people, few studies have reported their relationships between their personality profiles and depression. When reviewing the literature, this study just identified five related studies (Havar, Yasrebi, Hassanzadeh, Moshkani, and Kaboosi 2015; Gonzalez, Bockting, Beckman, and Durán 2012; D'Avanzo, Barton, Kapadia, and Halkitis 2017; Li, Zhang, and Song 2016; Zhao, Li, Song, and Zhang 2018). In the study of 122 transwomen (people are born as males with gender identity as females), Gonzalez and colleagues (2012) found that the depressive symptoms were associated with their agentic personality (r=-0.54, p<0.001) and communal personality (r=-0.24, p<0.01). The study of 528 sexual minority males including transgender people reported that 27.7% of the samples showed personality pathology, which was positively correlated with depressive symptoms (χ^2=43.2, p<0.001; φ=0.29) (D'Avanzo, Barton, Kapadia, and Halkitis 2017). Havar and colleagues (2015) further examined the specific personality pathologies that 20.4% of 108 transgender people reported depressive personality disorders and 12.0% reported

obsessive-compulsive personality disorders. Among the participants, 13.9% of them had comorbid depression.

Besides, there are two studies targeting the psychological status of Chinese transgender people (Li, Zhang, and Song 2016; Zhao, Li, Song, and Zhang 2018). Except for the personality of masculinity and femininity, the results reported that the levels of their personality profiles were not in the clinical range. Researchers further explored the relationships between their personality profile of social introversion and depressive symptoms. The positive associations were found (t=-2.573, p=0.013; t=-2.510, p=0.017). The results were consistent with studies of the general public (Kotov, Gamez, Schmidt, and Watson 2010), but the studies did not examine the associations between other personality profiles and depressive symptoms, and researchers did not take Chinese context into account. For instance, in a more conservative Chinese culture, transgender people might choose to conceal their gender identities due to their anticipation of negative responses such as discrimination, rejection, and victim and such concealment can lead to their hypervigilance and interpersonal sensitivity and also have adverse impacts on their mental health outcomes (Bockting et al. 2013). Overall, researchers confirmed the links between personality profiles and depressive symptoms among transgender people, but multiple aspects of their personality still remain unstudied and the results of studies can not be generalized to this group of people in different cultures.

The current study assessed the personality profiles and depression status of transgender individuals, and explored the correlation between their personality profiles and depression status. This study also compared their status with cisgender individuals whose gender identities agree with their sexes assigned-at-birth. The study aimed to conduct mental health screening among transgender individuals, which could investigate their personality profiles and depression status and shed light on the psychological needs of

them. This study was conducted in Shanghai, the largest city in China. There were three hypotheses in the study. First, based on results of previous studies (De Vries et al. 2011; Hoffman 2014; Kessler et al. 2005), this study hypothesized that the general level of personality profiles of transgender people was not in the clinical range, but the general level of their depression reached moderate or major. Second, the level of depression among transgender people was significantly higher than that of cisgender people, and the status of the personality profiles of transgender individuals was poorer than that of cisgender individuals. Third, this study would use Minnesota Multiphasic Personality Inventory (MMPI; Weiner and Greene 2006) to investigate the personality profiles of transgender people, so their personality profiles of hypochondriasis, depression, hysteria, psychopathic deviate, masculinity/femininity, paranoia, psychasthenia, schizophrenia, hypomania, and social introversion would be examined. According to the refection sensitivity model, rejection sensitivity of individuals might lead to maladaptive behaviours such as social withdrawal and aggressive responses (Feldman and Downey 1994; Zimmer-Gembeck et al. 2016). Considered that transgender people had experienced some gender-related rejections from family members, peers, colleagues, and so forth and also on the basis of the results of previous studies (Klein, Kotov, and Bufferd 2011; Whitehead, Shaver, and Stephenson 2016), we hypothesized that the level of personality profiles of depression, psychopathic deviate, paranoia, and social introversion could significantly contribute to the variance of depression level among transgender individuals.

Methods

Participants and Procedure

From September 2018 to July 2019, this study recruited 81 transgender participants who intended to take psychological assessments that should be taken at the beginning of their sex-reassignment treatment in Shanghai Mental Health Centre. They were recruited by psychometricians in the Shanghai Mental Health Centre since psychometricians could be more neutral than doctors for not being involved in the process of sex-reassignment treatment of transgender individuals. This study was conducted in Shanghai, the largest city in China. People were able to be included in this study when they identified themselves as transgender individuals, and they were required to be 16 or above 16 years old. Among transgender individuals who were asked to complete the scales for the research, their response rate was around 88%. Among 81 transgender participants who were willing to complete the scales, the data of 12.3% (n=10) individuals were removed because of missing values in their responses or not meeting the inclusion criteria. Besides, there were 73 cisgender individuals recruited as participants through the recruitment notice when they came to Shanghai Mental Health Centre to do internships and they were assigned to the control group. The inclusion criteria for them was that they should identify themselves as cisgender individuals and they were 16 or above 16 years old. In the final sample, there were 144 participants in total. The individuals participated in this study on a voluntary basis and they had been clarified before participating that their results would not influence their subsequent assessments or internships. Before all participants participated in the research, their written informed consents were obtained. As a research project in corporation with Shanghai Mental Health Centre, the study was approved by the Human Subjects Ethics Sub-Committee of the Hong Kong Polytechnic University.

Measures

Demographic information

In this study, participants were required to provide their demographic information at the beginning of completing the scales, including their age, sex assigned at birth, and gender identity.

Personality profiles

Minnesota Multiphasic Personality Inventory (MMPI) was adopted in this study to measure the personality profiles for seeing their psychological functioning of transgender individuals. In psychopathology, it is used in measuring personality profiles worldwide, and it has been tested for it's good validity and reliability in different countries, languages, and also different target population (Weiner and Greene 2006). MMPI is a self-report inventory with 399 items for clinical use. It has ten subscales, which involves Hypochondriasis (Hs), depression (D), Hysteria (Hy), Psychopathic Deviate (Pd), Masculinity/Femininity (Mf), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Hypomania (Ma), and Social Introversion (Si). Compared with measures of depression or depressive symptoms tapping recent experiences of individuals such as their experiences of the past week, the depression subscale in MMPI refers to the depressive personality that is a long-standing pattern of individuals. After participants completing the scales, every subscale will produce a raw score and an adjusted score after calculation (T score). The Chinese version of MMPI was revised in 1989, the average internal consistency reliability is 0.78-0.80, and it also showed good validity in the application (MMPI National Collaborative Team 1989). In the Chinese version, T score $\geq$ 70 may indicate that the participants have some potential psychotic personality characteristics. T score $\geq$ 55 is likely to demonstrate the potential problems of personality profiles or poor

psychological functioning of adapting to the society (MMPI-2 Training Slides 2015). Participants are estimated to spend 60-90 minutes to complete this scale.

Depression

Participants were asked to complete the subscale of Symptom Checklist 90 (SCL-90) to measure their depression level. SCL-90 was first made by Derogatis, Rickels, and Rock (1976), and now it is a commonly used scale in clinical assessment with the well-established validity and reliability. It has 90 items while 13 items of them belong to the depression subscale to measure depressive symptoms. The coefficiency of depression subscale is 0.90, and it's broadly used in supporting the clinical diagnosis of depressive syndrome for reflecting a wide range of concomitants, including diminishing interests of life, lack of motivation, feelings of hopeless, suicidal tendency, etc. Its Chinese version has already been tested in studies with good internal consistency (Feng and Zhang 2001). Participants are required to complete the scale based on their psychological status in the last week, and the response items range from 0 (not at all) to 4 (extremely). For depression level, scores of 2 or above suggested the moderate to major depressive symptoms, while lower than 2 scores suggested participants having no or mild depressive symptoms (Feng and Zhang 2001).

Analysis

Descriptive statistics were used to summarize the general information of demographic data and results of personality profiles and depression. This study used linear regression and logistic regression to see the differences between transgender individuals and cisgender individuals in their scores of MMPI and depression subscale of SCL-90 with controlling for the significant demographic differences in two groups. This study further examined relationships between personality profiles and depression levels in both groups

of transgender individuals and cisgender individuals by using multiple linear regression with adopting their age and sex assigned at birth as covariables.

Since the Mf subscale in MMPI is related to the stereotypical views of gender interests. In this study, it can reflect gender dysphoria among transgender individuals rather than psychotic personality or psychological dysfunction of them (De Vries et al. 2011). Thus, the Mf subscale in MMPI was excluded in the data analysis. The statistics were conducted in IBM SPSS, version 23.0.

Results

There were 144 participants with 71 transgender individuals and 73 cisgender individuals. The average age of participants was 24.10 years old, while the average age of transgender individuals was 24.15 years old and the average age of cisgender individuals was 24.04 years old. There was no significant difference in the two groups (t=0.145, p=0.885). Among participants, there were total 77 (53.5%) males (natal sex) with 45 transgender individuals and 32 cisgender individuals, and 67 (46.5%) females (natal sex) with 26 transgender individuals and 41 cisgender individuals ($\chi 2$ =5.526, p=0.019).

The mean T score of the Mf subscale in MMPI among transgender individuals was 73.77, which was in the clinical range (T score≥70). Among 73 transgender participants, 16 (22.5%) participants were in the subclinical range (55≤T score＜70), and 43 (60.6%) were in the clinical range (T score≥70). Except for descriptive analysis, we excluded the Mf subscale in the following data analysis.

Personality profiles and depression status among transgender individuals

Descriptive analysis of scores of MMPI and depression subscale of SCL-90 among transgender individuals were showed in Table 1 and Table 2. Among transgender participants, the mean scores of all subscales in MMPI were not in the clinical (T scores

⩾70) or subclinical (55≤T score＜70) range. For percentages of transgender individuals who were in clinical range in MMPI, the Pd subscale got the highest percentage of 11.3% of the transgender participants. Percentages of transgender individuals whose scores were in clinical range (T scores⩾70) in other subscales were lower than 10%. Around 20%-30% of transgender people were in subclinical range (55≤T score＜70) of subscales in MMPI and the highest percentage was 31.0% in the Hy subscale. Regarding depression level, the mean score of depression level of transgender individuals was 1.74±0.80, which suggested the general depression level of transgender people did not reach moderate or major, while 27.1% of transgender participants reported moderate or major depressive symptoms (depression score≥2) in depression subscale of SCL-90.

Differences between transgender individuals and cisgender individuals in personality profiles and depression level

Linear regression was used to see the mean differences between transgender individuals and cisgender individuals in their scores of MMPI and depression subscale of SCL-90 with controlling for the significant demographic differences. The results indicated there were significant differences between transgender individuals and cisgender individuals in the scores of personality profiles of Pd (t=3.682, p<0.01), Pa (t=3.049, p=0.003), Pt (t=1.990, p=0.048), Sc (t=3.082, p=0.002), and Ma (t=2.270, p=0.025). Transgender individuals seemed to have higher scores of these subscales in MMPI than cisgender individuals. Also, results showed that the depression level of transgender individuals was significantly higher than cisgender individuals (t=5.307 p＜0.01). The average score of cisgender individuals was 1.20 while the average score of transgender participants was 1.73, which was near a moderate depression level. The significant difference in depression level indicated the potential depression problems in the transgender population (see details in Table 1).

Based on the results of linear regression, we further conducted logistic regression to investigate the differences between transgender individuals and cisgender individuals in their percentages of clinical or subclinical scores with controlling for the significant demographic differences of two groups. Except for the Mf subscale in MMPI, the proportion of both groups who were in clinical range (T score≥70) of other subscales in MMPI did not exceed 15%, so that the most of transgender and cisgender participants did not seem to have significant pathological personalities in this study. When conducting logistic regression, we used 55 points of each subscale in MMPI as the boundary of subclinical range since 55 points or above might indicate the risk of pathological personality profiles or poor psychological functioning of adapting to the society for individuals (MMPI National Collaborative Team 1989). For depression level, scores of 2 or above suggested the moderate to major depressive symptoms (Feng and Zhang 2001). Based on the results of logistic regression, there were significant differences between transgender individuals and cisgender individuals in their percentages of subclinical range of Hs (OR=3.370, p=0.047), D (OR=4.649, p=0.005), Pd (OR=2.625, p=0.026), Pt (OR=3.323, p=0.026), Sc (OR=7.988, p=0.010), and Si (OR=3.100, p=0.013). The proportion of Transgender individuals who reported moderate or major depressive symptoms was also significantly higher than that of cisgender individuals (OR=6.738, p=0.002) (see details in Table 2).

The relationship between personality profiles and depression level among transgender individuals and cisgender individuals

After getting the trends that transgender individuals were more likely to report poor personality profiles and depressive symptoms, we continually examined the potential relationship between their personality profiles and depression level in groups of transgender individuals and cisgender individuals. Multiple linear regression was adopted

to examine the relationships with adopting the age and sex assigned at birth as covariables. The results of the multiple regression model in Table 3 suggested that two of the nine personality profiles contributed significantly to the variance of depression level of transgender people. These two personality profiles were Pd (β=0.324, p=0.005) and Pa (β=0.346, p=0.001). The personality profiles in this model accounted for 75.4% of the variance of the depression level among transgender individuals (R^2 adjusted=0.754, F=20.227, p<0.001). Among the personality profiles examined in this study, the VIF level of each personality profile was less than 10 except Pt, which indicated that Pt might have potential collinearity with other variables.

For cisgender participants in this study, the results of multiple linear regression showed that only Si (β=0.455, p=0.023) significantly contributed to the variance of depression level. The personality profiles in this model accounted for 31.1% of the variance of depression level among cisgender individuals (R^2 adjusted=0.311, F=3.960, p<0.001). Among the personality profiles examined in this study, the VIF levels of all personality profiles were less than 10 so that there was no colinearity among these variables of personality profiles (see details in Table 4).

Discussion

This study focuses on mental health screening by exploring the personality profiles and depression status among transgender individuals in mainland China, which intends to find the psychological needs of this population. This study investigated the depression status and personality profiles of transgender people with comparing with the cisgender counterparts. This study also examined the role of personality profiles in accounting for the variance of depression level among transgender individuals and cisgender individuals.

Overall, the general depression level and status of personality profiles among transgender individuals remained in the normative range, which partially confirmed the

first hypothesis of this study. Studies found similar results when targeting the transgender population (Colizzi, Costa, and Todarello 2014; Davis and Meier 2014; Hoshiai et al. 2010). These findings might shed light on the resilience of transgender people. They might be in a relatively unfriendly and stressful environment because of their gender identity (Meyer 2003), but their gender identity shouldn't be a reason for them to be defaulted to people with mental disorders or weak psychological functioning. Besides, we only described mean scores of the Mf subscale among transgender participants since the scores in this study could be related to their symptoms of gender dysphoria rather than the psychotic personality or psychological dysfunction of them. The results reflected their gender dysphoria and their discomfort with their gender roles in the stereotypical views of the public (De Vries et al. 2011; Lothstein 1984). Other researchers also found the relatively high scores of transgender people in this subscale (Miach et al. 2000), which suggested the transgender people might endorse stereotypical views of masculine or feminine interests, and following adverse mental health outcomes or gender affirmation process endorsement can be understood (Keo-Meier et al. 2015).

The general level of depression among transgender individuals did not reach moderate or major, which was not consistent with the first hypothesis. The results reflected a relatively healthy mental health status of transgender people and also showed their resilience in the face of the adversity in the society. However, compared with cisgender individuals, the mean score of depression level of transgender participants was significantly higher than that of cisgender individuals in this study and the percentage of transgender participants who showed moderate or major depressive symptoms (depression score≥2) was also significantly higher than that of cisgender individuals. Results were consistent with the second hypothesis, and other related studies (Holahan et al. 2005; Nemoto, Bödeker, and Iwamoto 2011). The results showed that the

incongruence between their sex assigned at birth and gender identity and the stressful environment may lead to a higher risk of greater depression among transgender individuals (Meyer 2003).

Transgender individuals had higher scores than cisgender individuals in personality profiles of psychopathic deviate, paranoia, psychasthenia, schizophrenia, and hypomania and higher percentages of transgender people reported scores of personality profiles in clinical (T score≥70) or subclinical (55≤T<score70) range than cisgender individuals, including hypochondriasis, depression, psychopathic deviate, psychasthenia, schizophrenia, and social introversion, which confirmed the second hypothesis. These personality profiles indicated that the gender identity of transgender individuals may bring some influence in shaping their psychological functioning. They may be at higher risk of poor psychological functioning and less equipped to develop adaptive coping strategies in the society because of their experiences of gender-related discrimination, rejection, and other negative responses from others (Earnshaw and Chaudoir 2009; Wang et al. 2014). Compared with previous research, some studies showed similar results with this study (Hepp et al. 2005), while some studies have reported that few transgender people were in the clinical range regarding their personality profiles (Smith et al. 2005; Keo-Meier et al. 2015). The differences in similar studies may be related to the sexual orientation, status in the process of sex-reassignment treatment and so forth among transgender individuals (De Vries et al. 2011).

When trying to account for the variance of depression status among transgender people, this research found that the personality profiles of psychopathic deviate and paranoia were correlated with their depression level, which partially confirmed the third hypothesis. Personality profile of psychopathic deviate reflects social alienation and self-alienation of individuals and paranoid individuals can be guarded and extremely sensitive

to the opinions of others. These personality profiles can demonstrate the interpersonal difficulties among transgender individuals (De Vries et al. 2011; MMPI-2 Training Slides 2015). According to refection sensitivity model, gender-related rejection from others can lead to over-sensitivity of transgender individuals and further lead to their maladaptive behaviours such as social withdrawal and aggressive responses, so it was not surprising that psychopathic deviate and paranoid styles of personality were found to be positively associated with depression level among transgender individuals and the findings can be traced back to previous studies for some related points (Sakado et al. 2000; Keo-Meier et al. 2015; Qi et al. 2019). In a relatively conservative Chinese culture, the general public lacks an understanding of transgender people. This group of people is likely to be considered as deviant and get rejected by others such as family members and peers after the disclosure of their gender identity (Pi Jun 2010). The rejection and internalized transphobia can lead to their over-sensitive and self-alienation for self-protection (Clements-Nolle, Marx, and Katz 2006; Bradford et al. 2013; Scandurra et al. 2018). Their continuing fearfulness, behaviour inhibition such as concealment of gender identity, and low level of a social attachment may further predict their depressive symptoms (Grucza et al. 2003).

It should be noted that the personality profiles of depression and social introversion were not significantly associated with the depression level of transgender individuals, which was inconsistent with the third hypothesis. The depressive personality is the long-standing pattern of individuals and this study indicated that there was no necessary connection between this long-standing pattern and the recent depression level of transgender individuals. In addition, the personality profile of social introversion did not significantly contribute to the variance of depression level among transgender individuals, but it was positively associated with depression level of cisgender individuals.

The results of cisgender individuals were in line with other studies targeting the general public (Kendler and Myers 2010; Kendler et al. 2009; Kendler et al. 2006; Kotov, Gamez, Schmidt, and Watson 2010). People with a high level of social introversion are more likely to feel timid and lack self-confidence (Hendricks and Testa 2012) and this personality profile has bidirectional impacts with the social and occupational experiences of individuals (Klein, Kotov, and Bufferd 2011). So in the face of the daily stressors in the social and occupational lives, people with a higher level of social introversion might be more likely to show depressive symptoms (Wichers et al. 2007). Previous studies targeting Chinese transgender people showed that social introversion was found to be associated with depressive symptoms (Li, Zhang, and Song 2016; Zhao, Li, Song, and Zhang 2018), which was inconsistent with the results of the current study. Researchers pointed out that social introversion personality might lead to self-isolation for self-protection and social introversive transgender people were not good at expressing their inner thoughts, which made them more likely to be depressed. The incongruence of results in this study might be explained by the differences in demographic information and the differences in stages of sex reassignment surgery can also have influences on the associations (Klein, Kotov, and Bufferd 2011).

The limitations of this study should be noted. This is a cross-sectional study and the results of participants come from a one-time point, which we can only see the correlation between their personality profiles and depression level. Longitudinal studies may need to be conducted to see the effects of personality profiles on mental health outcomes. The sample size in this study is relatively small and this study only recruited the demographic information of age and sex assigned-at-birth. So the limitation of generalization should be noted and the demographic information of transgender people such as their education level, employment status, and income level may also be related to

their mental health status, which can be included to see their associations. Moreover, the participants in this study were restricted to the transgender individuals who were intended to take sex-reassignment treatment. The stages of gender transition can have impact on their personality profiles and mental health status. So the transgender people who have not thought about endorsing the process should also be included to see their personality profiles and mental health status in the future. Moreover, future studies should also consider the roles of experiences of minority stress in shaping the psychological status of transgender people since this study only focuses on the individual factors of transgender people, which may run a risk of reproducing a deficit-oriented perspective.

There are some noteworthy implications as well. First, this study provides some evidence for us to understand the personality profiles and depression status of transgender people in the context of mainland China. Based on the results of personality profiles and depression levels among Chinese transgender people, we better understand the psychological needs among transgender people, and psychological intervention programs can be developed accordingly in the future. The psychological intervention program can focus on their self-alienation and the high level of interpersonal sensitivity. For the over-sensitivity of opinions from others, the related psychological program might work on their cognitive-behavioural perspective to relieve their depressive symptoms. Second, in the process of mental health screening among transgender people, we catch sight of the vulnerable status of them in the society. Future directions may focus more on how they interact with the society with their sexual minority status, for example, their resilience or stigma can be taken into account to further understand their psychological functioning and mental health status. Third, after the mental health screening of transgender individuals, healthcare services should be highlighted. Since transgender people are likely to be sensitive to the opinions of others, the unprofessional behaviours of healthcare

providers such as their rejection and even unintentional verbal offense might have adverse impacts on the psychological status of transgender people. Thus, the specific training for medical staff and social workers focusing on the psychological needs of transgender individuals might be helpful.

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Table 1 Linear regression of personality profiles and depression level between transgender individuals and cisgender individuals

Personality Characteristic and Depressive level	Transgender Individuals M(SD)	Cisgender individuals M(SD)	*t*	*p*
Hs	45.10(12.17)	42.94(6.72)	1.023	0.308
D	45.08(14.52)	41.39(9.75)	1.355	0.178
Hy	52.49(9.04)	50.68(8.19)	1.269	0.206
Pd	50.80(12.55)	45.21(8.57)	3.682	*p*<0.001
Pa	47.23(10.55)	42.86(6.72)	3.049	0.003
Pt	44.11(13.23)	39.65(8.29)	1.990	0.048
Sc	43.61(13.05)	37.88(6.90)	3.082	0.002
Ma	47.73(8.77)	45.11(7.46)	2.270	0.025
Si	42.92(16.05)	37.93(11.85)	1.620	0.108
Depression level	1.74(0.80)	1.20(0.34)	5.307	*p*<0.001

Note: Hs: Hypochondriasis, D: depression, Hy: Hysteria, Pd: Psychopathic Deviate, Pa: Paranoia, Pt: Psychasthenia, Sc: Schizophrenia, Ma: Hypomania, Si: Social Introversion.

Table 2 Logistic regression of personality profiles and depression level between transgender individuals and cisgender individuals

Personality Characteristic and Depressive level		Transgender Individuals n(%)	Cisgender individuals n(%)	OR (95%CI)	*p*
Hs	55-69	10 (14.1%)	4 (5.5%)	3.370 (1.015, 11.187)	0.047
	≥70	4 (5.6%)	0		

D	55-69	16 (22.5%)	5 (6.8%)	4.649 (1.598, 13.526)	0.005
	≥70	4 (5.6%)	0		
Hy	55-69	22 (31.0%)	24 (32.9%)	1.072 (0.529, 2.172)	0.847
	≥70	3 (4.2%)	0		
Pd	55-69	14 (19.7%)	12 (16.4%)	2.625 (1.120, 6.152)	0.026
	≥70	8 (11.3%)	0		
Pa	55-69	6 (8.5%)	6 (8.2%)	1.968 (0.675, 5.743)	0.215
	≥70	6 (8.5%)	0		
Pt	55-69	14 (19.7%)	6 (4.2%)	3.323 (1.156, 9.550)	0.026
	≥70	3 (8.2%)	0		
Sc	55-69	12 (16.9%)	2 (2.7%)	7.988 (1.655, 38.557)	0.010
	≥70	2 (2.8%)	0		
Ma	55-69	13 (18.3%)	7 (9.6%)	1.999 (0.709, 5.635)	0.190
	≥70	0	0		
Si	55-69	20 (28.2%)	9 (12.3%)	3.100 (1.273, 7.552)	0.013
	≥70	2 (2.8%)	0		
Depression level	≥2	19 (27.1%)	4 (5.5%)	6.738 (2.010, 22.583)	0.002

Note: Hs: Hypochondriasis, D: depression, Hy: Hysteria, Pd: Psychopathic Deviate, Pa: Paranoia, Pt: Psychasthenia, Sc: Schizophrenia, Ma: Hypomania, Si: Social Introversion.

Table 3 Multiple linear regression of the role of personality profiles in accounting for the variance of depression level among transgender individuals

Variable	Block 1					Block 2				
	B (SE)	β	*t*	*p*	VIF	B (SE)	β	*t*	*p*	VIF
Age	-0.056 (0.020)	-0.327	-2.798	0.007	1.123	0.001 (0.012)	-0.005	-0.069	0.945	1.462
Natal sex	-0.313 (0.193)	-0.190	-1.621	0.110	1.123	-0.167 (0.133)	-0.101	-1.253	0.215	1.829
Hs						0.005 (0.010)	0.083	0.531	0.597	6.872
D						0.002 (0.008)	0.040	0.279	0.781	5.843
Hy						-0.002 (0.011)	-0.026	-0.214	0.831	4.236
Pd						0.020 (0.007)	0.324	2.929	0.005	3.442
Pa						0.026 (0.007)	0.346	3.671	0.001	2.484
Pt						0.005 (0.012)	0.089	0.433	0.666	11.891
Sc						-0.002 (0.008)	-0.039	-0.302	0.764	4.563
Ma						0.006 (0.010)	0.064	0.578	0.560	3.367
Si						0.009 (0.007)	0.189	1.256	0.214	6.343

Note: Results of the final model were R^2 = 0.793, R^2 adjusted = 0.754, F = 20.227, p<0.001. Hs: Hypochondriasis, D: depression, Hy: Hysteria, Pd: Psychopathic

Deviate, Pa: Paranoia, Pt: Psychasthenia, Sc: Schizophrenia, Ma: Hypomania, Si: Social Introversion.

Table 4 Multiple linear regression of the relationships between personality profiles and depression level among cisgender individuals

Variable	Block 1					Block 2				
	B (SE)	β	*t*	*p*	VIF	B (SE)	β	*t*	*p*	VIF
Age	-0.006 (0.008)	-0.088	-0.747	0.457	1.008	-0.004 (0.007)	-0.052	0.508	0.613	1.076
Natal sex	-0.128 (0.080)	0.187	1.599	0.114	1.008	0.100 (0.079)	0.146	1.268	0.210	1.395
Hs						-0.002 (0.008)	-0.037	-0.250	0.803	2.306
D						-0.006 (0.006)	-0.172	1.008	0.317	3.036
Hy						-0.003 (0.005)	-0.082	-0.678	0.500	1.524
Pd						0.008 (0.005)	0.210	1.671	0.100	1.654
Pa						0.011 (0.006)	0.212	1.675	0.099	1.676
Pt						-0.003 (0.009)	-0.070	-0.326	0.746	4.863
Sc						0.011 (0.011)	0.214	0.974	0.334	5.063
Ma						-0.004 (0.007)	-0.094	-0.635	0.528	2.301
Si						0.013 (0.006)	0.455	2.328	0.023	4.001

Note: Results of the final model were $R^2 = 0.417$, R^2 adjusted = 0.311, $F = 3.960$, $p<0.001$. Hs: Hypochondriasis, D: depression, Hy: Hysteria, Pd: Psychopathic Deviate, Pa: Paranoia, Pt: Psychasthenia, Sc: Schizophrenia, Ma: Hypomania, Si: Social Introversion.