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Association of Auditory Hallucination and Anxiety Symptoms With Depressive Symptoms in Patients With Schizophrenia: A Three-month Follow-up

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ABSTRACT

This study was to investigate the association of auditory hallucinations and anxiety symptoms with depressive symptoms in patients with schizophrenia for three months. The participants ($N = 189$) were evaluated using Characteristics of Auditory Hallucination Questionnaire (CAHQ), Beck Anxiety Inventory (BAI), and Beck Depression Inventory-II. Forty-two participants suffered from depressive symptoms at both baseline and 3-month follow-up. Higher CAHQ and BAI at both periods predicted depressive symptoms at three-month end. Being male, increased severity of CAHQ and BAI were risk factors of depressive symptoms. Psychiatric professionals must educate patients to manage auditory hallucinations and anxiety symptoms to decrease depressive symptoms.

Introduction

Depressive symptoms are one of the core symptoms in patients with schizophrenia, but the effect of depressive symptoms on patients is easily overlooked. A study in China had utilized self-rating depression scales to investigate the prevailing rate of depressive symptoms in patients with schizophrenia and reported a rate of 54.1%, of which only 9.1% of patients were treated with antidepressants suggested that the problem of depressive symptoms is not taken care seriously. Severe depressive symptoms in patients with schizophrenia are not only affecting quality of life (Rayan, 2017) but also the risk factors of suicide (Fuller-Thomson & Hollister, 2016) and one of the reasons why the average life expectancy in patients with schizophrenia is 12 to 25 years lower than that of the normal population (Laursen, Munk-Olsen, & Vestergaard, 2012). Taiwanese scholars have conducted a study on chronic schizophrenia patients in the community, noting that approximately 33% of the 102 patients had suicide attempts, mainly due to the effects of depressive symptoms and anxiety symptoms (Kao, Liu, Cheng, & Chou, 2012).

Auditory hallucinations are the main positive symptoms of schizophrenia (American Psychiatric Association, 2013). The impact of auditory hallucinations often causes symptoms of depression and anxiety, and auditory hallucinations also aggravate depressive and anxiety symptoms (Hartley, Barrowclough, & Haddock, 2013). A multi-center study in the United States noted that 76% of 1460 patients experienced symptoms of auditory hallucination and that 44.4% had depressive symptoms in patients with chronic schizophrenia. This study also noted that when positive symptoms did not exist or at a low level, depressive symptoms and suicide attempt did not show a significant correlation, whereas in patients with positive symptoms, depressive symptoms and suicide attempt showed a correlation, indicating that the effects of positive symptoms on the patients cannot be ignored. Approximately 40% have persistent anxiety symptoms in patients with schizophrenia (Karpov et al., 2016), and if accompanied with depressive symptoms, the symptoms can cause a greater impact on the patients. We should assist patients to prevent from committing suicide when the depressive symptoms show up (Bornheimer, 2016).

From the above studies, we can observe that auditory hallucinations, anxiety symptoms, and depressive symptoms may exist simultaneously in patients with schizophrenia and those auditory hallucinations and anxiety symptoms both have an adverse effect on depressive symptoms. Most studies focus on investigating the relationship between auditory hallucinatory symptoms and depressive symptoms in patients with schizophrenia, the relationship between auditory hallucinatory symptoms and anxiety symptoms, or the relationship between anxiety symptoms and depressive symptoms. For example, a systematic review

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in the United Kingdom showed that increases in the severity of the positive symptoms (auditory hallucination) in patients with chronic schizophrenia can aggravate depressive and anxiety symptoms (Hartley et al., 2013). Two studies in Europe also revealed that 43–61% of patients with schizophrenia had depressive symptoms and those anxiety symptoms (Gozdzik-Zelazny, Borecki, & Pokorski, 2011) and that positive symptoms (Lako et al., 2012) were risk factors of depressive symptoms. However, these studies were all cross-sectional studies. A follow up study indicated that auditory hallucinatory characteristics had improved while emotional behaviors of auditory hallucination became nonsignificant between two periods with same antipsychotics dosage (Ma, Beckstead, Lo, & Yang, 2016). It is unclear whether these relationships persist over time. We posed the research question: Will the risk of the depressive symptoms increase when the auditory hallucinations or anxiety symptoms deteriorate?

To address this concern we have evaluated auditory hallucinations, anxiety symptoms, and depressive symptoms at two periods between 3 months. The current study is a three-month follow-up study that simultaneously monitored the influences of auditory hallucinatory symptoms and anxiety symptoms on the depressive symptoms of the patients.

Aim of the study

We hypothesize that auditory hallucinatory symptoms and anxiety symptoms serve as significant predictors of depressive symptoms. Therefore, in this study, we investigated the relationship between auditory hallucinatory symptoms, anxiety symptoms, and depressive symptoms in patients with chronic schizophrenia.

Methods

This study employed an observational study over three months and was conducted data collection twice from May 2012 to May 2013. A total of 189 participants were recruited by convenience sampling from a hospital based psychiatric center in northern Taiwan.

Participants and demographic data

Participants who had been diagnosed with schizophrenia according to DSM-IV criteria took part in the study after informed consent was obtained. All patients were 20 years of age or older and were receiving a stable dosage of antipsychotics, and had no history of cognitive impairment. The patients were able to express themselves and to individually complete the Characteristics of Auditory Hallucination Questionnaire (CAHQ), the Beck Anxiety Inventory (BAI), and the Beck Depression Inventory-II (BDI-II).

Measures

The demographic characteristics include six continuous variables (age, age at onset, numbers of admissions, duration of disease, years of education, chlorpromazine equivalent dose (Andreasen, Pressler, Nopoulos, Miller, & Ho, 2010) and five categorical variables (sex, marital status, work status, antidepressants, anxiolytics).

Variables and instruments

Auditory hallucination: the Characteristics of Auditory Hallucination Questionnaire (CAHQ)

The Characteristics of Auditory Hallucination Questionnaire (CAHQ) was used to measure the broad characteristics of auditory hallucinations in the past 24 h (Trygstad et al., 2002). A self-reported auditory hallucinatory characteristic is a 7-item Likert scale item. The CAHQ consists of frequency, loudness, self-control, clarity, tone, distractibility, and distress (Buccheri et al., 2004). Each item uses a unique 6-point scale ranging from 0 to 5. Higher scores indicate a higher degree of negative characteristics (e.g., more frequent, louder, less self-control).

The CAHQ was translated into a Chinese version. The reliability and validity of the Chinese version have been confirmed (Lee, Lin, & Yang, 2011). The instrument has good internal consistency (Cronbach's alpha = 0.889), high test-retest reliability ($r = 0.96$; two-week interval) and good validity (KMO = 0.880, $p < .001$); compared to the Auditory Hallucination Assessment Scale (AHAS), the criterion validity was correlated with the Characteristics subscale of the AHAS ($r = 0.517$, $p < .001$) (Lee et al., 2011). In addition, researchers have used the CAHQ to detect the effectiveness of an auditory hallucinatory symptoms management program in patients with chronic schizophrenia in Taiwan (Yang, Lee, Lo, & Beckstead, 2015). In this study, the Cronbach's alpha coefficient of the patients with schizophrenia at baseline was 0.882; at the three-month follow-up, it was 0.910.

Anxiety: the Beck Anxiety Inventory (BAI)

The BAI has 21 items. The response indicates how much they have been bothered by each symptom over the past week. It was developed as a measure adept at discriminating between anxiety and depression (Beck & Steer, 1990). The BAI is administered via self-report and includes an assessment of symptoms such as nervousness, dizziness, and inability to relax. The responses are rated on a 4-point Likert scale and range from 0 (not at all) to 3 (severely). Higher total scores indicate more severe anxiety symptoms, and a score of ≥ 14 points is considered suggestive of the presence of clinically significant anxiety symptom intensity (Che, Lu, Chen, Chang, & Lee, 2006).

The BAI was translated into a Chinese version. The reliability and validity of the Chinese version have been confirmed (Che et al., 2006). The instrument has good internal consistency (Cronbach's alpha = 0.95), high Guttman split-half reliability ($r = 0.91$) and convergent validity compared to the Hamilton Anxiety Rating Scale (HAM-A) (Pearson's $r = 0.72$, $p < .001$) (Che et al., 2006). Furthermore, researchers have used the Traditional Chinese version of the BAI-II to reveal the improvement in anxiety symptoms in patients with chronic schizophrenia receiving an auditory hallucinatory symptom management program (Yang et al., 2015). In this study, the Cronbach's alpha coefficient of the patients with schizophrenia at baseline was 0.940; at the three-month follow-up, it was 0.961.

Depression: the Beck Depression Inventory–II (BDI-II)

The Beck Depression Inventory–II (BDI-II) is a 21-item self-report depression screening measure (Beck, Steer, Ball, & Ranieri, 1996). Each item is rated on a four-point Likert-type scale ranging from 0 to 3, with higher scores indicating higher levels of depression. The respondents rate statements characterizing how they have been feeling over the past two weeks. The maximum total score is 63. The BDI-II has a higher internal consistency than the BDI-IA: the Cronbach's alpha coefficients were 0.92 for outpatients and 0.93 for college students (Beck, Steer, & Garbin, 1988). The BDI-II revision improved the content validity of the instrument by rewording and adding items to assess the DSM-IV criteria for depression. Higher total scores indicate more severe depressive symptoms and a score of > 16 points is considered suggestive of the presence of clinically significant depressive symptom intensity (Lu, Che, Chang, & Shen, 2002). The Traditional Chinese version of the *Beck Depression Inventory-II* was validated by Lu (Lu et al., 2002). The instrument has good internal consistency (Cronbach's alpha = 0.94) and high split-half reliability ($r = 0.91$) and criterion validity compared to the Chinese Health Questionnaire (CHQ-12) (Spearman's $r = 0.69$, $p < .001$) (Lu et al., 2002). Taiwanese researchers have used the Traditional Chinese version of the BDI-II as a secondary outcome indicator in patients with chronic schizophrenia receiving an auditory hallucinatory symptom management program (Yang et al., 2015). In this study, the Cronbach's alpha coefficient of the patients with schizophrenia at baseline was 0.921; at the three-month follow-up, it was 0.926.

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