THE COMPARATIVE STUDY OF MIND-READING AND EMOTIONAL RECOGNITION ABILITIES OF SCHIZOPHRENIC PATIENTS AND THEIR HEALTHY SIBLINGS

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ABSTRACT

Schizophrenia is a chronic mental disorder and one of the most common problems of the people suffering from this disorder is a decline in their cognitive abilities. Recognition of facial expressions is one of the aspects of human’s social cognition. Many symptoms of schizophrenic patients may be related to some of their cognitive disabilities in attribution of their mental states to themselves and others. The present study is aimed at examining the abilities of mind-reading and recognition of emotional states in schizophrenic patients and their healthy siblings in a comparative way. This is a case control study in which 30 patients (15 male and 15 female) hospitalized in Baharan Psychiatry Hospital of Zahedan in 2013 with an average age of 34.63 and 30 healthy siblings of schizophrenic patients (15 male and 15 female) with an average age of 30.56 were selected using convenience sampling. Neuropsychological test of Reading the Mind in the Eyes and the Neurological test of Pictures of Facial Affects were used to collect data. Statistical analysis was conducted using SPSS software, indices of descriptive statistics and statistical t-test. The results indicated that schizophrenic patients are less able than their healthy siblings in mind-reading ability (t= 6.79, df=58, p<0.05). Also a comparison between the emotional recognition scores of schizophrenic patients and their healthy siblings showed a significant difference (t= 8.666, df=58, p<0.05). The results show that nonverbal behaviors, processing and emotion recognition are among variables in schizophrenic patients. Thus, reinforcement and improvement of cognitive and social skills can be used in therapeutic planning of schizophrenic patients.

KEYWORDS: Mind-reading, Emotional Recognition, Schizophrenia

Schizophrenia is a psychotic disorder that affects almost 1% of the world’s population [1]. Schizophrenia often results in impairments in cognitive areas (such as concrete thinking, information processing disorder). Important cognitive areas affected in this group of patients mainly include attention, verbal fluency, memory, and executive performance. Schizophrenia is characterized by perceptual abnormality, delusional thoughts, and impairments in social areas, and affect[2-4] which is accompanied by extensive cognitive impairment [5]. Social cognition deficits are considered as the core of schizophrenia [6] and compared with healthy people, cognitive deficits is severe to medium among these patients [7]. Although schizophrenia is characterized by such positive and negative symptoms as hallucination and delusion, thought disorders and flat or inappropriate affect, recent studies emphasized cognitive deficits. Theory of Mind (ToM) or mind-reading ability as a part of social cognition is one of the important components of the set of abilities also known as Social Intelligence. ToM is the prediction of behavior based on mental states. This ability makes it possible for us in the society and in interaction with others to represent others’ thoughts, beliefs, attitudes, and goals in our minds like a chess player and show appropriate reactions [8]. Impairment of ToM was reported as one of the features of psychological disorders [9].

During the past decade, several studies were conducted to test the impairment of ToM in schizophrenic patients. In the majority of these studies, schizophrenic patients as a group had poor performance in the tasks of ToM compared with healthy participants and non-schizophrenic psychiatric patients [10, 11]. Also it was shown in Nejati research that schizophrenic patients’ overall scores in false-belief tasks were poorer than those of the normal group [12]. According to Frith, ToM impairment may cause for multiple deficits in schizophrenia. In most studies, schizophrenic patients had poorer performances in ToM tasks than healthy participants and this failure was more evident during the active stage of the disease. These evidence caused the impairment in ToM to be explaining as a neuropsychological pattern for psychiatric symptoms of...
schizophrenia [13]. Pedersen indicated that patients with schizophrenia have slow cognitive processing while doing ToM tasks [14]. Some researchers concluded that the severity of impairments has a relationship with the severity of schizophrenia symptoms such as thought disorder or positive symptoms [15]. Abu- Akel expressed that some schizophrenic patients with positive symptoms probably have better performances in ToM tasks [16].

Another variable that affects schizophrenic patients and contributes to the exacerbation of these patients’ symptoms is processing and emotional recognition. Emotions influence different aspects of our lives, form our relationships, and stimulate our activities. One of the main dysfunctions associated with schizophrenia disorder is the way emotions are processed in patients. There may be a special disability among these patients in the way they emotionally communicate and correspond with others, and schizophrenic patients may have much more problems in recognizing and expressing their emotions [17]. Studies show that both features of identification and recognition of emotions and expressing them, and affective and emotional expressions are impaired in schizophrenic patients [18, 19]. Cedro showed that patients with schizophrenia have more problems in identifying and expressing their emotions [20]. Some patients suffering from schizophrenia express very little emotions and report that they do not experience any emotion. Studies show that amygdala activity in schizophrenic patients is reduced during emotional processing [21] and some studies indicate that the size of amygdala in these patients is diminished [22]. Deficits in schizophrenic patients’ emotional recognition is caused by dysfunction of frontal and temporal lobes [23]. In many cases, decrease in amygdala activity may be an automatic mechanism in which schizophrenic patients suppress the processing of facial stimuli. This mechanism of suppression helps patients avoid excessive stimuli during their communications [24]. Disability in recognition of facial emotions is regarded as one of the components of neuropsychological dysfunction in schizophrenia. Deficit in facial recognition decreases the individual and social functions of patients with schizophrenia. There is evidence in support of the assumption that schizophrenic patients have more serious problems in recognition of facial emotions. Also some evidence was found regarding the abnormality in the recognition of facial emotions in schizophrenic patients [25, 26]. Evidence also indicates that patients suffering from schizophrenia are not able to recognize their own feelings and have many problems in the recognition of negative emotions [27]. In another study, schizophrenic patients had more errors in emotional recognition than the healthy group [28-30]. In schizophrenic patients with negative symptoms, due to such behavioral deficits as avolition, mutism, anhedonia, emotional blunting, and social indifference, almost no stimulus can stimulate their emotional responses [31]. Therefore, considering the remarkable importance of social cognition and emotional recognition deficits in these patients as well as the contradictory results of previous studies and lack of similar studies in Iran, this study was conducted with the aim of examining and comparing the abilities of mind-reading and recognition of emotional states in schizophrenic patients and their healthy siblings.

MATERIALS AND METHODS

The present study is a case control study. The population is composed of all schizophrenic patients hospitalized in the psychiatric ward of Baharan psychiatry Hospital of Zahedan in 2013.

The inclusion criteria for schizophrenic patients included confirmation of the diagnosis of schizophrenia using structured clinical interview and diagnostic and statistical criteria of mental disorders (DSM-IV-TR) by psychiatrist and clinical psychologist, ability to establish verbal communication, orientation to time and place, education more than primary school, a higher age of 16, and permission granted by patient’s guardian for participation in the research. The exclusion criteria for schizophrenic patients included records of alcohol and drug abuse, brain damage or comorbidity other mental disorders.

The inclusion criteria for healthy siblings included lack of records of mental disorders, lack of referral to psychological and psychiatric clinics, informed willingness and consent for participation in the research, education higher than primary school, a higher age of 16, and being matched in terms of sex.

The exclusion criteria for healthy siblings included records of drug and alcohol abuse, suffering from physical diseases, brain damage and brain infectious diseases. The research sample consisting of 60 persons (30 schizophrenic patients, 30 healthy siblings from schizophrenic patients’ families) was selected using convenience sampling with regard to inclusion criteria.
and being matched in sex, age, and education with the experimental group.

**Data collection tools**

The instruments used in this study were:

**The neuropsychological test “Reading the Mind in the Eyes”**

This test, which is a neurological test to evaluate mind-reading ability, was developed by Baron-Cohen, et al. 2001. This test shows the special impairments of ToM in patients with autism spectrum and schizophrenia disorders. The revised form of this test includes photographs from the eye region (from eyebrows to halfway down the bridge of the nose) of actors in 36 different forms. For each photograph, four words describing mental states with similar emotional capacity are presented. Respondents are asked to pick the word that best describes the mental state of the person in the photograph. The maximum score achievable for choosing the right words in this test is 36 and the minimum is zero. In the scoring stage, each correct answer is worth one point and the overall scores range from zero to 36. Overall scores between 22 and 30 demonstrate a medium theory of mind; scores lower than 22 shows a low theory of mind; and scores higher than 30 indicate a high theory of mind.

**Neurological Test Pictures of Facial Affect**

This test includes 36 pictures of facial affects developed and collected by Ekman and Friesen in 1976. These pictures are facial photographs of both sexes that display the six main emotions (anger, disgust, fear, happiness, sadness, and surprise) and the participant should be able to recognize and check the appropriate emotion by looking at each picture. This test is administered through computer and graded as 0 and 1, and the performances of participants are evaluated using the number of their correct answers.

**Procedure**

The data was analyzed using SPSS version 19 and results were presented in the form of table. In descriptive level, frequency, percentile, mean, and standard deviation, and in inferential level, independent statistical t-test for comparing the means of the two groups was used to test the research hypotheses.

**RESULTS**

The present study was conducted in two groups of 30 composed of schizophrenic patients and their healthy counterparts and both groups were matched in terms of sex, age, and education. The average age of patients was 34.63 (with a SD of 11.54) and that of the control group was 30.56 (with a SD of 8.19). Independent t-test was utilized to compare the abilities of mind-reading and recognition of emotional states in schizophrenic patients and their healthy counterparts (tables 1 and 2).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Schizophrenic Patients</th>
<th>Healthy siblings</th>
<th>t</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability of Emotional Recognition</td>
<td>11.86±4.36</td>
<td>19.33±4.15</td>
<td>6.790</td>
<td>58</td>
<td>0.000</td>
</tr>
<tr>
<td>Mind-Reading Ability</td>
<td>13.26±3.43</td>
<td>21.23±3.68</td>
<td>8.66</td>
<td>58</td>
<td>0.000</td>
</tr>
</tbody>
</table>

In the comparison of the patients and control groups’ mean scores in emotional recognition, a significant difference was seen (t=6.79, df=58, p=0.000), the healthy siblings enjoyed a better ability of emotional recognition. Also comparing the two groups’ mean scores in mind-reading showed a significant difference (t= 8.66, df=58, p=0.000), among healthy siblings and patients in ability of mind-reading.
Table 2: Comparing the mean scores of mind-reading and emotional recognition abilities in male and female schizophrenic patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>Schizophrenic Patients</th>
<th>T</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability of Emotional Recognition</td>
<td>Male</td>
<td>13.25±3.13</td>
<td>0.028</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>13.28±3.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mind-Reading Ability</td>
<td>Male</td>
<td>13.75±4.55</td>
<td>2.81</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.71±3.02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table 2 shows that emotional recognition ability (t= 0.028, df=28, p=0.97) is not significantly different between male and female schizophrenic patients. However, there is a significant difference between the mind-reading ability of male and female schizophrenic patients (t= 2.81, df = 28, p=0.009), in a way that male schizophrenic patients enjoy a better mind-reading ability compared with female patients.

Table 3: Comparing the mean scores of mind-reading and emotional recognition abilities in healthy siblings

<table>
<thead>
<tr>
<th>Variables</th>
<th>Healthy siblings</th>
<th>T</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability of Emotional Recognition</td>
<td>Male</td>
<td>21.07±3.12</td>
<td>0.22</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21.37±4.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mind-Reading Ability</td>
<td>Male</td>
<td>18.75±4.15</td>
<td>0.81</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21.07±4.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As seen in the table 3, there is no significant difference between male and female healthy participants in terms of their emotional recognition and mind-reading abilities (t= 0.22, df=28, p=0.82).

DISCUSSION AND CONCLUSION

The results of the present study, which was aimed at examining the mind-reading and emotional recognition abilities of schizophrenic patients and their healthy siblings in a comparative way, showed that schizophrenic patients have problems in mind-reading compared with healthy people and their performances in reading minds are poorer than those of healthy people. This result is in line with the findings of Mazza [32], Brune [33], Pinkham[34], Irani[35], Mo [36], Koelkebeck [37], Bakhshipour [38], Cermolace [39], Hooker [40], Bozikas [41] and Calleti [42]. In order to explain these findings, it can be said that according to the ToM impairment model of Frith, impairment in ToM can lead to psychotic symptoms in schizophrenic patients, because if the patient fails to know his beliefs as a reflection of reality, then it would be difficult for him to make a distinction between subjective and objective matters and this can contribute to the formation of delusions. Schizophrenic patients’ disability in recognizing and evaluating other people’s thoughts causes the perceptions with internal sources to be experienced as external perceptions. Lack of insight into the existence of disease in oneself can also be a symptom of self-evaluation disorder, which can affect the interpersonal relations, social capabilities, and compliance of schizophrenic patients [43]. Such factors as long duration of disease, decrease in sensory stimuli, disorder in interpersonal and social relations and so forth, play an important role in the decline of schizophrenic patients’ cognitive performances. Moreover, under-activation of anterior cingulate and orbitofrontal cortex in schizophrenic patients can serve as a good explanation for these patients’ cognitive damages[4]. The decreased gray matter in temporal gyrus and medial prefrontal cortex is also another possible explanation for impairment in ToM [40, 44].

Another finding of this research is that schizophrenic patients had lower scores in emotional recognition test compared with healthy counterparts. This finding is in line with Bjorklund, Bloom, and Keefe. [7, 45, 46]. Schizophrenic patients are impaired in a wide range of cognitive-social areas, one of which is impairment in recognition of emotional facial expression. Thus, it can be concluded that high experience of negative emotion, decreased emotional responsiveness, decrease in patient’s contact with his friends and family, impairment
in ToM, and lack of appropriate emotional interaction with others can be very important factors in the recognition of emotional facial expressions in schizophrenic patients. Studies show that recognition of emotional facial expression is a crucial factor in one’s health and successful performance in interpersonal and social relations [47, 48]. In order to explain this finding, it can be mentioned that schizophrenic patients suffer from disorder in having a proper evaluation of the personality and emotion of facial stimuli, and this disorder is more severe in emotional stimuli. This result is a predictor of schizophrenic patients’ perceptive problems in processing facial information; problems that are more evident in facial emotions. Since nonverbal behaviors are accompanied by negative effects, they can prevent the establishment of strong interpersonal relations and hence the patient’s improvement. Also weak nonverbal behaviors make these patients concentrate their minds mainly on their negative points, disabilities, and incompetence's and not establishes more productive and positive relationships. Emotional abnormality is probably a key symptom of these patients’ level of incompetence and can be used to differentiate this disease from other disorders. Based on these findings, therefore, reinforcement and improvement of cognitive skills can be used in therapeutic planning to increase the efficiency and improve the performance of schizophrenic patients in an effective way. On the other hand, schizophrenic patients can be taught to accept the fact that behavioral change is achievable and this change requires treatment of cognitive problems. Although treating functional problems with an emphasis on improving cognitive deficiencies is a long process, it is possible if there is enough therapeutic skill and experience available. The findings of this research are a tiny step towards increasing our knowledge in the area of schizophrenic patients’ cognitive performance. Among the limitations of this research was the fact that schizophrenic patients were under drug therapy. Thus, it is possible that the type of medication they were taking could affect the patients’ cognitive performances. Therefore, it is recommended that the effect of drug therapy in these patients’ cognitive performances be studied in future research.

**ACKNOWLEDGEMENT**

Hereby, we appreciate the managers and head nurses of psychiatric ward of Baharan psychiatry Hospital of Zahedan Iran and all the patients who cooperated us on this research.

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