Article

No Sex-based Differences in Self-reported Empathy between Patients with Schizophrenia and Control Subjects

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Abstract

Background: Schizophrenia, one of the most disabling disorders worldwide, is characterized by impaired empathy, which appears to be more common in women.

Methods: This study aimed to compare empathy levels between control subjects and patients with schizophrenia by sex. We compared sixty-two patients with schizophrenia and 166 control subjects. All participants completed the Empathy Quotient (EQ) questionnaire. A multivariate analysis of variance model was performed with the EQ as the outcome criterion, and group and sex as fixed factors to test for interaction effects.

Results: Overall, patients obtained lower scores in the cognitive, emotional reactivity and social skills domains of empathy ($p < 0.001$). No differences between men and women were found and no interaction effect was identified between sex and group (schizophrenia vs. control) ($p > 0.05$).

Conclusion: This study adds to the evidence on differences in social cognition between people with and without a mental illness such as schizophrenia. It also identifies the absence of sex differences between men and women, observed in both the group of patients and control subjects, which warrants further exploration.

Keywords

schizophrenia; sex; empathy; social cognition

Introduction

Empathy is the ability to understand and share the thoughts and feelings of others [1,2]. It is a multidimensional construct comprising three main components: (a) emotional empathy, (b) cognitive empathy and (c) motor empathy.

The affective response of a person who is able to understand and share the internal states of others is known as emotional empathy. This response includes empathic concern or feelings of compassion and warmth towards another person and the emotional distress associated with emotional contagion by those experiencing fear, sadness, or pain. Emotional empathy requires the suppression of one's own emotional state and forms part of healthy emotional regulation [3].

Cognitive empathy is the ability of an individual to represent the mental state of another person in their mind. Ickes [4] calls this "reading the mind" or empathic accuracy, which can enhance the ability to help others. Motor

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empathy or social skills involves mimicking the movements of another person, such as emotional expressions, body posture, and movements [1,5].

Empathy deficits have been identified in patients diagnosed with schizophrenia in comparison with control subjects [6–8]. These deficits are associated with prognosis and social functioning [9–11]. Cognitive empathy has been found to explain variations in measures of social function in those with schizophrenia when results are adjusted for neurocognitive and clinical symptoms [12]. However, some authors have reported that empathic behavior evaluation may be modified by individual differences, such as sex, culture, and societal influences that should be considered when assessing empathy [13].

Regarding the effect of individual differences on empathy, it has been reported that women with schizophrenia display higher levels of self-reported empathy than men, a difference that appears to increase with age [14]. Likewise, women outperform men in measures of facial affect images and tests of first- and second-order false beliefs when results are adjusted for intelligence and negative symptomatology [15]. However, the inconsistent findings of these studies raise the possibility that sex differences in social cognition in schizophrenia may differ according to the type of measure used (such as objective versus subjective measures), which in turn may affect the relationship between social cognition and functioning [16].

Social interactions and cultural environments may also directly influence the way empathy is expressed across development and sex. For example, in some contexts, men may control their affective expression more, thereby reducing their capacity for empathy, whereas empathic control may not decrease in women, in whom emotions are generally more permitted and therefore, more freely expressed [7,13]. The recent study by Zhao *et al*. [17] describes the role of the interaction between sex and culture in self-reported empathy measured through the Empathy Quotient questionnaire. The authors suggest that scores on this instrument may vary with ethnicity as a result of a cultural bias that could be due to local customs. The results of cross-cultural comparisons between Chinese and Russian samples provide evidence of differences between the sexes and cultures. Kornilova & Zhou [18] found that Russian women reported greater affective empathy than men, whereas Chinese women showed higher affective and cognitive empathy and greater knowledge of theories of emotion than men. Given these findings, measures of self-reported empathy should consider the cultural context of the subjects being assessed when interpreting scores.

It is widely believed that women have greater empathic ability than men. However, this result is inconsistent and appears to be less true of individuals with schizophrenia. Several studies have shown comparable performance in social cognition domains between men and women with schizophrenia [19,20] and failed to observe greater empathy in women. Instead, they report certain aspects of empathy (such as compassion) in which women perform better [16].

Since the degree of difference in empathy by sex remains unclear, the present study aimed to compare the level of empathy between control subjects and patients with schizophrenia and to determine whether empathy differs between men and women in a Latin American country such as Mexico. We hypothesized that individuals with schizophrenia would display lower empathy than healthy controls and that women in both groups would display greater emotional empathy than men in their respective groups (control vs. schizophrenia).

Data and Methods

Study Design and Participants

We performed a cross-sectional comparative study with patients diagnosed with schizophrenia and control subjects using a convenience sample approach. The study protocol and procedures were approved by the Institutional Review Board of the Ramón de la Fuente Muñiz National Institute of Psychiatry (INPRFM) (CEI/C/009/2015 and CEI/M/014/2020) and strictly follows the ethical principles and guidelines of the Declaration of Helsinki. The study was conducted between September 2020 and October 2021.

Sixty-two patients with schizophrenia according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition criteria (DSM-5) [21] were recruited at the Schizophrenia Clinic outpatient service of the INPRFM in Mexico City. The INPRFM is a specialized mental health center focusing on research, education, and the treatment of individuals with psychiatric disorders. Participants with schizophrenia were included if they were over 18, currently under pharmacological treatment, and deemed clinically stable enough (with only mild symptoms) to complete the assessment according to the treating psychiatrist. They were also required to have scored $\leq$3 on eight core Positive and Negative Syndrome Scale (PANSS) items (delusion, unusual thought content, hallucinatory behavior, conceptual disorganization, mannerism/posturing, blunted affect, social withdrawal, lack of spontaneity) [22]. Patients were excluded if they had a severe comorbidity that could affect their ability to complete the questionnaire or their empathy.

Control subjects: This group included individuals from the general population in Mexico City. Recruitment was performed by approaching potential participants in public places such as malls, bus stations, and parks. Those who agreed to participate were screened with the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) [23], while those who met the diagnostic criteria for any diagnosis were excluded. Subjects were also excluded if they reported a history of any psychiatric disorder or previous use of a psychiatric facility. Screening yielded a total of 166 control subjects.

Assessment Procedures

The nature, objectives and procedures of the study were explained to all those interested in participating. After the control subjects had given their verbal consent to participate and once their written informed consent had been obtained, they were assessed by psychiatrists previously trained to use the SCID-I interview.

Clinical data were obtained from patients' medical records and clinical interviews. Patients' current symptom severity was assessed using the Positive and Negative Syndrome Scale (PANSS) based on the five-factor model approach (with positive, negative, cognitive, agitation, and depression/anxiety components), validated in individuals with schizophrenia in the Mexican population [24]. The five-factor model approach showed adequate reliability values ($\geq$0.80) and construct and concurrent validity.

Both the clinical interview and symptom severity assessment using the PANSS were performed by three trained psychiatrists experienced in the diagnosis and treatment of psychotic disorders. Inter-rater reliability was >0.80. During the clinical interview and assessment of the cognitive PANSS dimension, patients' cognitive ability to respond to self-report measures was assessed together with the presence of severe comorbidities, with no significant cognitive impairment or comorbidity being found.

After the face-to-face interviews, both the control subjects and individuals with schizophrenia were asked to answer the Empathy Quotient (EQ) questionnaire. The twenty-two-item self-report version of the EQ validated in Mexican population by Saracco-Álvarez *et al*. [25] was used. The EQ assesses three related domains of empathy called cognitive empathy (ten items), emotional reactivity (eight items), and social skills (four items). Scoring is based on a four-point Likert scale ranging from "strongly agree" to "strongly disagree". Depending on the meaning of the item and the subject's response, each item was then scored according to the magnitude of the empathic response, with 0 for a "non-empathic" response and 1 for a "mildly empathic" and 2 for a "strongly empathic" response. The total score of each domain was obtained by adding its respective items. The EQ showed adequate construct validity and adequate internal consistency of the total score (Cronbach's alpha = 0.80). In addition, the dimension of cognitive empathy displayed high reliability (Cronbach's alpha = 0.85), while the emotional reactivity and social skills dimensions exhibited lower reliability indexes (Cronbach's alpha = 0.60, respectively). Despite these moderate reliability values, a congruence factor analysis was performed using the twenty-eight-item version of the EQ [26], yielding adequate congruence coefficients ($\geq$0.89) [25].

Statistical Analyses

All analyses were performed with the SPSS Statistics 21.0, IBM Corp, Armonk, NY, USA. First, age and sex were compared between groups using an independent *t*-test and a chi-squared test (χ^2), respectively. Skewness and kurtosis were used to test the distribution of EQ domains. A multivariate analysis of variance (MANOVA) model was then performed with the three EQ domains and total EQ score as outcome criteria, and group (schizophrenia vs. control subjects) and sex (males vs. females) as fixed factors to test their interaction effect. The effect size according to Cohen's *d* [27] was calculated for the significant results obtained in the MANOVA model between groups and was interpreted as small (d = 0.2), medium (d = 0.5) or large (d = 0.8). The significance level for the tests was set at $\alpha < 0.05$.

Results

Men accounted for 45.8% (n = 76) of the control subjects and 54.8% (n = 34) of the patients (p = 0.22), with similar ages between the groups (patients: 33.9 years vs. controls: 32.2 years, p = 0.14). The clinical features of the patients with schizophrenia at the time of the study are shown in Table 1.

The domains and total score of the EQ scale showed acceptable values of skewness and kurtosis (skewness range 0.14 to 0.47 and kurtosis range –0.78 to –0.61).

For the MANOVA model, the analysis of homogeneity of variances tested with Box's test of equality of covariances showed that the assumption of equal variances was not met (Box's M = 109.9, $p < 0.001$). Significant differences were found between patients with schizophrenia

Table 1. Clinical features of patients included in the study.

Clinical features	n	%
Previous psychiatric hospitalization - Yes	40	64.5
Current treatment		
First-generation antipsychotics	11	17.7
Second-generation antipsychotics	51	82.3
	Mean	S.D.
Age of onset of illness (years)	21.9	5.6
Positive and Negative Syndrome Scale (PANSS)		
Positive dimension	21.5	3.9
Negative dimension	20.8	3.8
Cognitive dimension	18.6	3.1
Agitation	4.5	1.3
Depression and anxiety dimension	7.4	2.5
Total score	73.1	10.3

S.D., Standard Deviation.

and control subjects (Wilks' Lambda = 0.60, F = 48.6, $p < 0.001$) with a nonsignificant difference being found between men and women (Wilks' Lambda = 0.99, F = 0.64, $p = 0.58$) together with a lack of group by sex interaction effect (Wilks' Lambda = 0.99, F = 0.65, $p = 0.57$). The comparison of the mean scores of the EQ domains by gender and group are shown in Table 2. Lower scores were reported by the group of individuals with schizophrenia in contrast to control subjects with high Cohen's *d* effect size indexes (cognitive dimension = 0.81, 95% CI = 0.45–1.05; emotional reactivity dimension = 1.44, 95% CI = 0.97–1.60; social skills dimension = 1.73, 95% CI = 1.31–1.96; and total EQ score = 1.66, 95% CI = 1.14–1.78).

No significant associations were found between the EQ domains and either the total PANSS score or the symptom dimension scores (all r correlation values were <0.16, with *p* values > 0.05).

Discussion

The main objective of the present study was to determine whether empathy differed by sex. In our study, differences were only observed between the control and patient groups with no differences being observed between men and women, even in the control group. This differs from reports such as the one by Baron-Cohen & Wheelwright [28], which observes an apparent difference in a population of 197 subjects, in which women perform better on empathy tests than men.

The differences observed in this study are in line with other reports. People with schizophrenia perform worse on empathy tests (such as the EQ), in cognitive empathy, affective empathy, and social skills than healthy controls [29–33]. Moreover, those with schizophrenia may retain emotional responses to emotional stimuli at the behavioral level [6,9,34,35]. These findings suggest that the expression of empathy varies rather than being homogeneous, and that certain individuals will display empathy deficits while others will be more proficient in these areas. This dynamic process is expressed across a range of social domains, such as close personal relationships, professional care, and group emotions. The expression of empathy is observed to be deficient in those with schizophrenia, regardless of sex [26,36]. Like cognitive empathy, affective empathy and social skills are closely related to functioning. Interventions could focus on improving skills in these areas or offsetting empathic deficits in other ways. For example, interventions for individuals with autism with empathic deficits could be effective in teaching compensatory skills through psychoeducation, interpersonal interaction, video simulation, virtual reality, or metacognition, which could enhance empathic interactions [37,38]. These methods could also be explored in people with schizophrenia, particularly in metacognitive reflection and insight therapies to enable them to form complex, integrated ideas about the social world and other people [39].

Some studies have reported that individuals with schizophrenia, can empathize but are more likely to do so with negative emotions, as in emotional contagion from fear or disgust, with a possible link existing between empathy and psychopathology [12,31,40]. Several studies have observed an association between empathy and negative symptoms [41], positive symptoms [32,42], depression [43], and anxiety [44,45]. Conversely, other studies did not find an association [31,46,47], which is consistent with our results. We believe that the inclusion of clinically stable patients, coupled with the use of a self-report measure of empathy, may have influenced the failure to detect an association between empathy and psychopathology. Future studies will require the use of other more ecological measures of empathy designed to examine the interaction of empathy with other forms of social cognition.

Evidence of the relationship between schizophrenia and empathy remains contradictory. Lehmann *et al*. [8] note that perspective-taking decreases with the duration of the disorder and may be further hindered as the disorder continues. Impairment and increasing disability are associated with poor performance on tasks requiring contextual processing focused on social relationships, regardless of the time of onset [48], which would explain why empathy behaves similarly in men and women. Although people with schizophrenia have significant empathy deficit, this can be modified by interventions with a positive effect on

Table 2. Empathy among patients with schizophrenia and control subjects by sex.

Empathy domains (EQ)		Total[a] n = 228		Control[b] n = 166		Schizophrenia[c] n = 62		MANOVA
		Mean	S.D.	Mean	S.D.	Mean	S.D.	
Cognitive	Men[1]	10.0	4.6	11.1	4.8	7.5	3.1	Group F = 23.9, $p < 0.001$
	Women[2]	9.8	4.1	10.4	4.3	7.8	2.6	Sex F = 0.1, $p = 0.73$
	Total	9.9	4.3	10.7	4.5	7.6	2.9	Group x Sex F = 0.6, $p = 0.41$
Emotional reactivity	Men[1]	8.0	3.4	9.1	3.3	5.4	1.8	Group F = 69.5, $p < 0.001$
	Women[2]	8.7	3.0	9.5	2.9	6.1	1.4	Sex F = 1.4, $p = 0.22$
	Total	8.3	3.2	9.3	3.1	5.7	1.7	Group x Sex F = 0.2, $p = 0.64$
Social skills	Men[1]	2.8	2.1	3.6	2.0	0.9	0.8	Group F = 99.0, $p < 0.001$
	Women[2]	3.1	2.4	3.8	2.2	1.0	0.8	Sex F = 0.02, $p = 0.87$
	Total	3.0	2.2	3.7	2.1	0.7	0.7	Group x Sex F = 0.6, $p = 0.42$
Total score	Men[1]	20.9	8.0	23.9	7.5	14.0	3.8	Group F = 94.9, $p < 0.001$
	Women[2]	21.6	7.3	23.7	7.0	14.8	2.7	Sex F = 0.07, $p = 0.79$
	Total	21.2	7.6	23.8	7.2	14.4	3.4	Group x Sex F = 0.2, $p = 0.62$

Note: Group F was obtained by comparing the total scores of each dimension between control subjects and patients with schizophrenia (total scores from columns b and c). Sex F was obtained by comparing the total scores of each dimension between men and women (data in rows 1 and 2 in column a). Group x Sex F was obtained from the comparison of the scores of each dimension between men and women (rows 1 and 2) and between groups (columns b and c). EQ, Empathy Quotient; MANOVA, multivariate analysis of variance.

empathic skills, such as cognitive remediation and therapy [49] or metacognition, through exercises designed to combat reasoning biases and improve self-reflection [50]. These strategies can improve isolated skills and encourage people to think in a more flexible, less fragmented way. People with schizophrenia should be able to recognize their own needs and those of others, thereby increasing empathy [51].

Limitations and Suggestions

Our study has certain limitations that should be considered when interpreting results. First, we have a sample size limitation on the group of individuals with schizophrenia, compounded by the inherent limitations of the convenience sampling approach. In addition, all the patients with the disorder were clinically stable. Future studies should include a greater number of participants with varying degrees of severity of the disorder recruited from a range of mental health services and perform an analysis by pairing samples at least by age and sex. A second significant limitation was that the number of years of schooling was not assessed. It is common to find differences in education between patients and control subjects. In addition to the value schooling has for daily coping strategies, education promotes social contact and may therefore have a direct impact on social cognition features, including empathy. Education should therefore be a core variable to assess in future studies of empathy in individuals with schizophrenia. Third, it is important to highlight the use of a self-report measure in assessing empathy. Both individuals with schizophrenia [7], and control subjects [16] may have a distorted perception of their ability to be empathetic, either underestimating or overestimating it. The use of additional empathy measures, such as behavioral measures [9] could help reduce or prevent this common problem when using self-report measures. However, the results of our study can contribute to the empirical evidence that empathy is a multifaceted construct warranting further research.

Conclusion

This study adds to the evidence of differences in social cognition between those with and without a mental illness such as schizophrenia. It also describes the absence of sex differences between men and women, observed in both the groups of patients and control subjects.

Availability of Data and Materials

The data presented in the present manuscript is available on request from the corresponding author.

Author Contributions

RSÁ: Conceptualization, Methodology, Assessment, Supervision, Writing Draft Investigation, Data Curation. RRG: Conceptualization, Methodology, Validation, Writing Draft. YFM: Methodology, Validation, Data Curation. Writing Draft. JLON: Assessment, Validation, Data Curation, Writing Draft. CATZ: Validation, Investigation, Visualization, Writing Draft. RAL: Methodology, Validation, Data Curation, Writing Draft. REO: Assessment, Validation, Data Curation, Writing Draft. AF: Conceptualization, Methodology, Formal analysis, Supervision, Writing Draft. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study protocol and procedures were approved by the Institutional Review Board of the Ramón de la Fuente Muñiz National Institute of Psychiatry (INPRFM) (CEI/C/009/2015 and CEI/M/014/2020) and strictly follows the ethical principles and guidelines of the Declaration of Helsinki. All participants received a full explanation of the nature and procedures of the study, with those who volunteered to participate providing written informed consent. Informed consents from parents or guardians were not obtained as all patients were adults and able to give their informed consent. Patients were clinically stable and no cognitive impairments, that may affect their judgment to give consent, were observed during the assessment. In addition to the patients, two witnesses sign the consent.

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Conflict of Interest

The authors declare no conflict of interest.

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