

The Comparison of Negative Facial Expressions Ability among Schizophrenic Spectrum Patients (Paranoid/Non-paranoid), Their Siblings and Healthy People

Nazanin Seyed Yaghoubi*, Leila Shateri, Abbas Bakhshipour Rudsar, Touraj Hashemi Nosratabad and Naimeh Mashinchi Abbasi

Department of Psychology, University of Tabriz, Tabriz, Iran

Abstract

Introduction: According to literature schizophrenic patients have problems in cognitive domains, particularly social cognition and it's one of the most studied social cognition processes in schizophrenia. The present study aims to investigate the ability to recognize negative facial expressions in schizophrenic patients (paranoid/non-paranoid) in comparison with their siblings and healthy people.

Methods: This research was conducted with comparative method and the population was schizophrenic spectrum patients (paranoid/non-paranoid), their siblings and healthy people. Using convenience sampling, 60 paranoid schizophrenic patients and 60 non-paranoid schizophrenic patients, 119 siblings, and 30 healthy people were selected. Ekman test which displays 60 pictures used to measure facial expressions recognition ability. The results were analyzed through Multivariate Analysis of Variance Method (MANOVA).

Results: Findings showed that non-paranoid schizophrenic patients had a lower performance in the diagnosis of the negative facial expressions rather than their siblings ($P<.001$), while no significant differences were found between paranoid schizophrenics' performance and their siblings. There was a significant difference between the ability of the siblings of non-paranoid schizophrenics in comparison with healthy people.

Conclusion: It can be concluded that deficits in the recognition of facial expressions is a cognitive deficit that intensifies the negative symptoms of schizophrenia disorder.

Keywords: Negative facial expressions • Paranoid schizophrenia • Non-paranoid schizophrenia • Schizophrenia

Introduction

Schizophrenia is a phenomenon which has broadly examined over past few decades [1]. The exact causes of abnormalities in this disorder are unknown; it defined by neurodevelopmental abnormalities in brain structure and function and diagnosis made by using subjective criteria of psychiatric diagnostic manuals. Schizophrenia is mainly a combination of positive symptoms (e.g. delusions and hallucinations); negative symptoms (e.g. lack of pleasure and motivation) and cognitive symptoms (e.g. disorganized thinking or memory impairment). These symptoms include wide range of heterogeneous presentations which means two schizophrenic patients may share no common symptoms and they

may show several distinct disorders or a spectrum of disorders, but for the present, schizophrenia is considered as a single entity. Previous research on schizophrenia has focused on the patient's perceptions and cognitions; findings revealed some deficiencies in facial expression recognition [2].

Facial emotion recognition the ability to assess another person's emotional state from their facial expressions is considered as one of the most studied social cognition processes in schizophrenia. Facial expressions play a significant role in understanding and recognizing emotions. Even the term "interface" suggests the importance of the face in communication between two persons. Studies have shown that reading facial expressions can dramatically alter the interpretation of what is being said and control the flow of

*Address for Correspondence: Nazanin Seyed Yaghoubi, Department of Psychology, University of Tabriz, Tabriz, Iran, E-mail: Nazanin.s.yaghoubi@gmail.com

Copyright: © 2023 Yaghoubi NS, et al. This is an open-access article distributed under the terms of the creative commons attribution license which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Received: 13 December, 2022, Manuscript No. CSR-22-83214; Editor assigned: 16 December, 2022, PreQC No. CSR-22-83214 (PQ); Reviewed: 30 December, 2022, QC No. CSR-22-83214; Revised: 23 March, 2023, Manuscript No. CSR-22-83214 (R); Published: 31 March, 2023

conversation [3]. People interpret other's personality characters, appearance and emotional states mainly based on their facial cues; consequently, impaired social interaction is a common in schizophrenic patients. The literature of deficits in social interactions in schizophrenia spectrum has examined this impairment and assumed it as a vulnerability factor. Facial expression models have studied in disorders like depression dementia and schizophrenia [4]. Therefore, deficit in this ability is related to neurological aspect of the disorder and is one of the common cognitive impairments which have been broadly studied in various psychiatric disorders, particularly in schizophrenia [5].

Various endophenotype studied for schizophrenia include neurocognitive dysfunction, neurological soft signs, disordered eye movements, dermatoglyphics anomalies, minor physical anomalies, structural and functional neuroanatomic deficits as revealed by imaging studies, temperament and character, decreased social drive, stress sensitivity, mood bias towards negative emotion and Social Cognitions (SC). These deficits are found in both patients and at risk groups [6].

Social Cognition (SC) consists of various psychological processes such as recognizing people's mental state and it can be considered as a lower level simulation factor that contains first-order representations of others' mental states or as mentalization ability which defines complex mental state attributions [7]. SC impairments have been related to the psychopathological core of schizophrenia more than positive, negative and disorganizing symptoms [8]. Findings indicated significant interferences in paranoid, disorganized, recovered schizophrenics and patients with positive and negative symptoms using emotional recognition tools [9]. It has been established that amygdala in these patients has lower activity during emotion processing and a decline in amygdala's volume was seen, also these patients showed higher deficits in recognition of positive facial emotion rather than negative facial emotion recognition; which relates to their amygdala system. Generally, human is social being, perception of others emotions and needs in order to understand the social environment is significant; lack of flexibility in social interactions is very common in people with deficits in this area, particularly in people with schizophrenia [10]. Social cognitive impairments have a significant impact on social functioning, and social cognition acts as a mediator between neurocognition and social functioning. In the frame of social cognition by Frith, majority of symptoms in patients might relate to cognitive deficits in interpretations of mental states of oneself and others. Firstly, if schizophrenic patients have deficits in behavioral perceptions, their reactions or responses to the environmental stimuli might seem disorganized, secondly, if patients become unable to recognize their responses as result of their own actions, they may find their behavior being under the control of others, thirdly, if they misinterpret their own interpretations, it is possible that they misunderstand others intentions.

Accordingly Browne and colleagues in their neurological research documented that non-paranoid schizophrenics showed higher deficits in perception of negative emotions whereas, paranoid patients showed better functions in understanding negative emotions, in contrast showed higher deficits in understanding fear and aggression. This problem followed by less activity of amygdala and frontal lobe. Totally, in compare to non-paranoids, paranoid

patients showed better overall activity in response to fear and hate stimuli and they diagnosed emotions of fear and hate more accurately. In normal people, dynamic emotional expressions were recognized more precisely than stable ones [11]. SC deficits in patients with schizophrenia were greater than their first degree relatives who are in turn had greater deficits rather than healthy controls. Findings revealed that schizophrenic first degree relatives reported problems in social perception and mentalizing emotional processing. However, they did not show any significant clinical social cognition deficits, their overall function was low in comparison with general population which was indicated by effect sizes in moderate range. Recently, SC has also been evaluated as an endophenotype for patients with schizophrenia which are defined as the mental operations underlying social interactions and include human's capacity to perceive the intentions and dispositions of others. Patients with schizophrenia have been frequently shown to have deficits in SC and Neuro-Cognitions (NC) and the unaffected relatives of patients as they carry the genetic liability and also share environmental factors [12].

The current study

The literature on SC deficits among First Degree Relatives (FDR) of patients with schizophrenia is limited, therefore, Social Cognition (SC) of schizophrenic patients' siblings underline the need for research. Since previous research were carried out to identify difference in facial expressions of schizophrenic patients and their trait through recovered patients, the main purpose of this study determine the ability of facial expression in the paranoid, non-paranoid schizophrenics, their sibling and normal people. And to understand that if is there any difference in recognition of negative facial expressions in paranoid and non-paranoid patients? And if there were any differences, the main cause is state related or trait related?

Materials and Methods

Procedure and participants

This is a cross-sectional study with comparative method. First, the subjects were described that they were chosen for research and their participation was optional and after signing an informed consent. The consent provided them information about the study which will help them understand what it is about and help them to decide whether or not they would like to participate in the said study. Sample was hospitalized patients of Razi Hospital in Tabriz, Iran, the healthy siblings of schizophrenic patients and normal people. Participants were selected using convenience sampling method and included 60 paranoid schizophrenic patients (17 female and 43 male patients), 60 non-paranoid schizophrenic patients (23 female and 37 male patients), 119 healthy siblings of schizophrenic patients and there were 30 healthy subjects who matched in the age and education level with the groups of patients. The age of the study group was between 18 and 60 years old. Then, these individuals were screened for the following eligibility criteria.

Inclusion criteria: Having paranoid or non-paranoid schizophrenia based on psychiatric reports healthy control without disorders and having schizophrenic sibling.

Exclusion criteria: History of substance abuse, brain injury, and chronic physical disorders except schizophrenia. Semi-structured interview conducted by researchers' group to assess these criteria. Ekman test used as tool and it consisted of 60 images which were presented for 1 second. The content validity of this has been confirmed by several psychologists. The retest reliability of this scale in a sample of 30, is 0.68. The results were analyzed through Multivariate Analysis of Variance method (MANOVA) [13].

Ekman test

The Ekman 60 faces test uses a range of photographs from the Ekman and Friesen series of pictures of facial affect which has been the most widely used and validated series of photographs in facial expression research. From this series, the faces of 10 actors (six females, four male) were chosen, each displaying six basic emotions (happiness, sadness, disgust, fear, surprise and anger). The Ekman 60 faces test can be used to assess recognition of facial expressions

of basic emotions. The maximum test score indicating best performance is 60 for all six emotions and 10 for each basic emotion. The computer software for the test was available on CD-ROM. Patients were allowed unlimited time for the response [14]. Immediately prior to testing, we verified that patients understood the words anger, disgust, fear, happiness, sadness and surprise. Patients were asked to provide an example for each emotion by answering the questions: "Name a situation when you feel happiness, fear, etc."

Results

In this study, as shown at Table 1 the box test were not significant. Also, the value of Wilkes Lambda was 928 ($F=2.47$, $P<.05$) was meaningful. In addition, the analysis of variance indicates that groups have significantly different in the recognition of negative facial emotional expressions ($F=4/46$, $P<.05$).

	Variable	Sum square	Df	Mean squares	F	Sig
Contrast	Negative emotions	36	4	9	4.46	0.002
Error		528.26	262	2.02		

Table 1. Univariate analysis of variance of negative facial expressions ability among schizophrenic spectrum patients.

The pairwise comparison according to Table 2 shows paranoid schizophrenic patients have a better recognition of negative facial expressions than non-paranoid schizophrenic patients [16].

Moreover, paranoid schizophrenic patients showed better ability in recognition of negative facial expressions in compared to paranoid patients' siblings and non-paranoid patients' siblings.

Variable	Group	Mean difference	Standard error	Sig
Negative emotions	Paranoid and non-paranoid schizophrenia	0.7	0.29	0.01
	Paranoid schizophrenia and paranoid sibling	0.54	0.26	0.04
	Paranoid schizophrenia and non-paranoid siblings	0.06	0.26	0.001
	Paranoid schizophrenia and healthy people	0.001	0.33	0.003
	Non-paranoid schizophrenia and healthy people	0.31	0.34	0.36
	Nnon-paranoid schizophrenia and non-paranoid sibling	0.36	0.27	0.19
	Paranoid sibling and non-paranoid schizophrenia	0.15	0.31	0.63
	Paranoid sibling and non-paranoid siblings	0.51	0.28	0.06
	Paranoid sibling and healthy people	0.46	0.34	0.17
Healthy people and non-paranoid siblings	0.05	0.32	0.87	

Table 2. Pairwise comparison for negative facial expressions ability among schizophrenic spectrum patients.

Discussion

Present study showed that non-paranoid schizophrenic patients (with negative symptoms) were less capable to identify negative facial expressions in compare to paranoid patients (with positive

symptoms). This result is in line with findings of Firth [17]. Schizophrenic patients with negative symptoms responded weaker than normal control group in facial emotion and identity tasks, this

may be as result of the fact that paranoid patients indicated general deficits in identifying facial expressions. In this regard, previous studies which examined emotion perception revealed that non-paranoid patients had better emotion perception in compare to paranoid ones. However, some other studies do not support this finding. Despite previous findings, which indicated that patients with paranoid symptoms have greater impairment in emotion perception and theory of mind, the current study did not observe such a relationship [18]. These contradictory results can be as result of the fact that patients with and without paranoid symptoms were not different in emotion perception ability. However, patients with paranoid symptoms were more inclined to interpreting neutral facial expressions as anger ones. For example, those who reported low levels of paranoia by using traditional retrospective measurements showed considerable moment to moment fluctuations in paranoia and a weak correlation was also found between current paranoid and paranoid at the subsequent time point. A recent study also identified several behavioral concomitants of daily intra-individual fluctuation in paranoid patients, such that increased within person was, counter intuitively, positively correlated with feeling social and sleeping well in patients with schizophrenia spectrum disorders since Murphy and Cutting only carried a study on the improved patients in this research, so the investigators of the present study examined patients' siblings. A study involving two groups of patients with paranoid ideation and non-paranoid at the moment of testing showed a significant difference only in tasks of emotionally neutral faces, which means those with paranoid thoughts make mistake in neutral faces to be an expression of anger. Findings of their cognition of emotionally neutral faces reported higher activity in certain areas of brain in these patients including: amygdala, hippocampus, para hippocampus, and fusiform gyrus in comparison with healthy controls [19].

Moreover, the term understanding others has two, affective and cognitive component. Affective component describes affect sharing while the person is aware of other's emotion, like feeling sad while comforting unhappy friend. The cognitive component or Theory of Mind (TOM) explains cognitive inference of others mental state which based on others behavior or actions and interpretations about their intentions this ability needs awareness of others mental state which can be different from one's own, and a relationship has been shown between incapability of facial expressions recognition and some negative symptoms of the disorder. Generally, paranoid schizophrenics had better ability in recognition of fear and hatred stimulus and they responded better to these emotions in compare to non-paranoid schizophrenics and also, the study showed that paranoid patients had better ability than their siblings in the recognition of negative emotions. Furthermore, neurological research reported that paranoid schizophrenics showed better function in recognition of hatred emotion whereas; non-paranoid patients had fewer deficits in recognition of negative emotions. In contrast, paranoid ones had deficits in recognition of fear and anger stimuli. The reason lies in dysfunction of amygdala and frontal lobe [20].

Based on present study's findings, the leading factor in the deficits of recognition of facial expressions was regarded facial factor. Unaffected siblings of schizophrenic patients demonstrated impaired recognition of negative facial expressions in compare

with positive facial expressions. The relatives of schizophrenics exhibited deficits in accuracy of facial emotion intensity perception, although, it has been argued that moderate to strong genetic influence facial emotion processing accuracy; it might be an indicator of schizophrenia. Considerable efforts are made to identify features, which help identifying people who are at risk of this disorder at the earliest, much before the onset of symptoms. Identification of endophenotypes is one of the strategies for the same.

The term "endophenotype" was first described for psychopathology as an internal phenotype *i.e.*, not obvious to the unaided eyes, that fills the gap between symptoms and the putative genes. Endophenotypic markers are understood as those vulnerability factors, which are present as a trait in the asymptomatic phase of the illness in those with an illness, are heritable and are also present in the unaffected relatives. These are stable factors which are present in all stages of illness in patients (premorbid prodromal illness recovery) and also in high risk individuals. These may be biochemical, endocrinological, neurophysiological, neuro-anatomical and neuro-psychological markers.

Studies on SC among relatives of schizophrenic patients reported lower mean effect size than reported one for patients with schizophrenia for mentalising ($g=.96$), emotional processing ($g=.89$) and social perception ($g=1.04$). Even though, relatives did not display important clinical SC deficits, they showed lower performance than what is normally expected in the general population; as indicated by effect sizes in moderate range.

Since Salem and colleagues only carried a study on the improved patients in this research, so the investigators of the present study examined patients' siblings and normal people. As the results this study showed the siblings of schizophrenics also had problems in the recognition of facial expressions, this confirms that these deficits are facial. Moreover, results confirmed that paranoid patients had better function in negative facial emotion recognition rather than non-paranoid siblings. Davis and Gibson in their research claimed that paranoid schizophrenics recognized genuine stimuli more accurately than the non-paranoid and normal groups. However, they were less precise in recognizing posed facial expressions and they found that patients had deficits only in posed or simulated facial emotion stimuli recognition, not for genuine facial emotion stimuli. Results of this study considering better ability in the recognition of facial expressions of paranoid schizophrenic patients, in comparison with healthy people is inconsistent with previous researches. It could be explained that schizophrenic patients had deficits in the assessment of personality and higher deficits in assessment of emotional facial stimuli.

These results predict that the perceptual problems of facial expressions in schizophrenics are problems which are in the facial emotions. The studies of Phillips et al indicated that schizophrenic patients have a deficiency in recognizing positive emotions compared to negative emotions, so that they act better in recognizing negative emotions which is due to the amygdala activity related to the 8-Fing intermediates. These patients make false judgment about facial emotions, even though paranoids performed better in the name of negative emotions than other emotions research also revealed although these patients have deficits in revealing emotions and perceiving facial expressions, hence, in paranoid ones, they diagnosed negative facial emotions relatively correct.

The findings showed that some interference in facial expression and personality is significant in people's wellbeing which is in line with the research of Gur et al. regarding this, responding accurately to a facial expression state without mistaking for other facial expressions is not a result of single process. The process might interfere with other process; therefore, the selective attention to the intended facial expression requires active association process interventions. These interventions provide selective answer to any of facial expressions. Moreover, there is strong relationship between negative symptoms of schizophrenia and deficits in communication skills with identity and emotion; as a result, social communications are affected by mentioned symptoms.

The cognition process is comorbid with facial emotional expressions and cognitive associations; accordingly, the selective responding ability to emotions may be followed by psychiatric disorder. The amygdala has a significant role in association of emotional expression and abnormalities in amygdala's function may result in dysfunctions in emotion association in schizophrenics which is proved by the results of current study. Paranoid schizophrenics have less stress in recognizing posed emotions; whereas, in the case of spontaneous emotions, this group showed better ability rather than healthy controls which is in line with the results of Akbarian and Huang. Presence of persecutory thoughts in paranoid schizophrenics reduces the ability to recognize emotion. Thus, the results showed that paranoid's persecutory thoughts are connected to their emotion recognition.

Several studies report a relationship between impaired theory of mind and increased paranoia in schizophrenic patients; however, other studies do not support this relationship. Given the attribution styles, results of studies implicate that patients with paranoia are more inclined to use hostile and blaming attributions compared with those without paranoia. It has been established that, in comparison to other forms of schizophrenia, paranoid schizophrenia shows a lower deficit in the recognition of emotional facial expressions.

Paranoid structure and ideations in these patients excessively affects cognitive organization by which they give meanings to what they perceived their perception completely determined by expectations excluding its real function which is a considerable bias in perception of patients with delusions with the content of persecutory. These patients enrolled on the framework of attributional measures and their tendency to jump to conclusions based on low data. Jumping to conclusion is a feature of delusional patients and those with deficits in probabilistic reasoning (they aren't able of using data about probabilities while they conclude) this kind of cognitive flexibility which results in occurrence and maintenance of persecutory ideations and it facilitates the immediate acceptance of inaccurate hypotheses. Colbert et al. described that the driving force in process of jumping to conclusions can be defined as the "need for closure" which is a consequence of difficulty in enduring ambiguities.

Conclusion

Paranoid schizophrenic patients have a better ability in the recognition of negative facial expressions than non-paranoid schizophrenic patients. Both groups of paranoid and non-paranoid schizophrenic patients have less ability in the recognition of negative facial expressions compared to healthy people.

Non-paranoid schizophrenic patients have less ability in the recognition of negative facial expressions than paranoid and non-paranoid patient's sibling. Non-paranoid patient's siblings in comparison with healthy people have less ability in the recognition of negative facial expressions. Thus, it can be inferred that deficit in the recognition of facial expressions is a cognitive deficit that intensifies the negative symptoms of schizophrenia disorder.

Ethical Consideration

Ethical consideration (i.e., voluntary, privacy, anonymity, confidentiality) were clarified. Participants in the research were informed that they would be free to participate and could discontinue at any time. All respondents were provided with information about the study and signed an informed consent form prior to participating in the study. The participants provided socio-demographic details and completed a set of questionnaires.

Acknowledgments

Thanks to all the participants who helped us with this research.

Funding Statement

None.

Declaration of Interest Statement

We have no known conflicts of interest to disclose.

Patient Consent Statement

This Consent will provide you information about the study which will help you understand what it is about and by which should help you decide whether or not you would like to participate in the said study. The participation in this study is purely voluntary. You may withdraw at any period through the duration of the study. The withdrawal will not incur any penalty on the part of the participant. Our right to withdraw/discontinue: You are free to discontinue your participation at any time without penalty. You may also skip any survey questions that make you feel uncomfortable. Upon completion of the activity, participant may ask about the result and may ask questions.

References

1. Akbarian, Schahram, and Hsien-Sung Huang. "Molecular and cellular mechanisms of altered GAD1/GAD67 expression in schizophrenia and related disorders." *Brain Res Rev* 52 (2006): 293-304.
2. Albacete, Auria, Clara Bosque, Nuria Custal, and Jose M Crespo, "Emotional intelligence in non-psychotic first-degree relatives of people with schizophrenia." *Schizophr Res* 175 (2016): 103-108.
3. Allen, Allyssa J, Mélina E Griss, Bradley S Folley, and Keith A Hawkins, et al. "Endophenotypes in schizophrenia: a selective review." *Schizophr Res* 109 (2009): 24-37.

4. Andreasen, Nancy C, Stephan Arndt, Randall Alliger, and Del Miller, et al. "Symptoms of schizophrenia: Methods, meanings, and mechanisms." *Arch Gen Psychiatry* 52 (1995): 341-351.
5. Bentall, Richard P, Georgina Rowse, Nick Shryane, and Peter Kinderman, et al. "The cognitive and affective structure of paranoid delusions: a transdiagnostic investigation of patients with schizophrenia spectrum disorders and depression." *Arch Gen Psychiatry* 66 (2009): 236-247.
6. Bond, Gary R, Robert E Drake, and Jacqueline A Pogue. "Expanding individual placement and support to populations with conditions and disorders other than serious mental illness." *Psychiatric services* 70 (2019): 488-498.
7. Bora, Emre, and Christos Pantelis. "Theory of mind impairments in first-episode psychosis, individuals at ultra-high risk for psychosis and in first-degree relatives of schizophrenia: systematic review and meta-analysis." *Schizophr Res* 144 (2013): 31-36.
8. Bourque, Josiane, Nadia Lakis, Julie Champagne, and Emmanuel Stip, et al. "Clozapine and visuospatial processing in treatment-resistant schizophrenia." *Cogn Neuropsychiatry* 18 (2013): 615-630.
9. Brewer, Warrick J, Stephen J Wood, Lisa J Phillips, and Shona M Francey, et al. "Generalized and specific cognitive performance in clinical high-risk cohorts: a review highlighting potential vulnerability markers for psychosis." *Schizophr Bull* 32 (2006): 538-555.
10. Browne, Stephen, Mark Roe, Abbie Lane, and Maurice Gervin, et al. "Quality of life in schizophrenia: relationship to sociodemographic factors, symptomatology and tardive dyskinesia." *Acta Psychiatr Scand* 94 (1996): 118-124.
11. Buck, Benjamin, Emily Scherer, Rachel Brian, and Rui Wang, et al. "Relationships between smartphone social behavior and relapse in schizophrenia: A preliminary report." *Schizophr Res* 208 (2019): 167-172.
12. Chuang, Ching-Cheng, Kazuyuki Nakagome, Shenghong Pu, and Tsuo-Hung Lan, et al. "Discriminant analysis of functional optical topography for schizophrenia diagnosis." *J Biomed Opt* 19 (2014): 011006-011006.
13. Cleynen, Isabelle, Worrawat Engchuan, Matthew S Hestand, and Tracy Heung, et al. "Genetic contributors to risk of schizophrenia in the presence of a 22q11. 2 deletion." *Mol Psychiatry* 26 (2021): 4496-4510.
14. Colbert, SM, ER Peters, and PA Garety. "Delusions and belief flexibility in psychosis." *Psychol Psychother* 83 (2010): 45-57.
15. Combs, Dennis R, Christopher O Michael, and David L Penn. "Paranoia and emotion perception across the continuum." *Br J Clin Psychol* 45 (2006): 19-31.
16. Cotes, Robert O, Mina Boazak, Emily Griner, and Zifan Jiang, et al. "Multimodal Assessment of Schizophrenia and Depression Utilizing Video, Acoustic, Locomotor, Electroencephalographic, and Heart Rate Technology: Protocol for an Observational Study." *JMIR Res Protoc* 11 (2022): 36417.
17. Davis, Penelope J, and Melissa G Gibson. "Recognition of posed and genuine facial expressions of emotion in paranoid and nonparanoid schizophrenia." *J Abnorm Psychol* 109 (2000): 445.
18. Di Domenico, Alberto, Rocco Palumbo, Nicola Mammarella, and Beth Fairfield. "Aging and emotional expressions: is there a positivity bias during dynamic emotion recognition?." *Front Psychol* 6 (2015): 1130.
19. Ekman, Paul, and Wallace V Friesen. "Measuring facial movement." *Environ Psychol Nonverbal Behav* 1 (1976): 56-75.
20. Ekman, Paul, and Harriet Oster. "Facial expressions of emotion." *Annu Rev Psychol* 30 (1979): 527-554.

How to cite this article: Yaghoubi, Nazanin Seyed, Leila Shateri, Abbas Bakhshipour Rudsar, and Touraj Hashemi Nosratabad, et al. "The Comparison of Negative Facial Expressions Ability among Schizophrenic Spectrum Patients (Paranoid/Non-paranoid), Their Siblings and Healthy People." *Clin Schizophr Relat Psychoses* 17 (2023).