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## The effectiveness of the social cognition intervention among the patients with schizophrenia

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Social cognition impairment has been demonstrated significantly in schizophrenia, causing functional problems. Although growing body of evidence in the last years have studied the efficacy of many social cognitive training programs among schizophrenic patients, most of these studies focus on certain domains such as emotion perception and theory of mind, with little focus on attributional bias and social perception. Additionally, these studies were conducted only in the Western and Asian cultures. Hence, assessing the effect of such programs on Egyptian patients would have a special value. The study examined the effectiveness of social cognition intervention among the patients with schizophrenia. A total of twenty schizophrenic patients were sequentially allocated to 15 sessions of intervention designed to target the core domains of social cognition. Schizophrenic patients at baseline were compared with control group of twenty people with no psychiatric disorder. Assessment of symptomatology and social cognition was completed using the Arabic version of the Structured Clinical Interview for DSM IV Axis I disorder, Penn Emotion Recognition Test, Social Perception Scale, and Internal, Personal, and Situational Attributions Questionnaires. The baseline measures of social cognition were repeated in the schizophrenic group following the intervention. The results revealed statistically significant improvement in emotion and social perception following the intervention. However, there was no statistically significant difference regarding treating attribution bias toward positive and negative events. To conclude, social cognition intervention has a salutary effect on patients with schizophrenia. Further studies are needed to get expansive enhancement in social cognition and generalization of such interventions.

**Keywords:** attribution bias, emotion perception, schizophrenia, social cognition intervention, social perception.

### INTRODUCTION

#### Schizophrenia, Social cognition.

Schizophrenia is a challenging mental disorder that affects approximately 1% of the world's population (American Psychiatric Association, 2013). Cognition deficits as well as disturbed social life have been known as fundamental characteristics of schizophrenia for over one hundred years (Roder and Medalia, 2010). Regardless of the notably development in

antipsychotic medication, individuals with schizophrenia have poor social integration and numerous changes in each day existence abilities. The focal point of studies in schizophrenia has shifted from lowering classical symptomatology (e.g. positive symptoms) to increasing capabilities and social competency. So, researches focusing on social cognitive deficits in schizophrenia have gained much attention, especially over the last decade (Green and Horan, 2010). The term social

cognition is defined in various ways, but generally refers to "the mental operations that underlie social interactions, including perceiving, interpreting, and generating response to the intentions, dispositions, and behaviors of others" (Lincoln et al. 2011). The mechanism of social cognition includes obtaining information about the arena and people with whom we engage. This can be accomplished in an indirect way when the acquired information is based on understanding of other people, and by a direct way by independently collecting information about the surrounding (Bodnar et al., 2014). Social cognition impairments were found to persist throughout the course of illness; they are seen in prodromal patients and are even found in unaffected relatives of patients (Rose et al., 2015).

Social cognition components include social perception, attribution, emotion perception, and theory of mind (Paquin et al. 2014). The first component of social cognition is emotion perception, which is the ability to recognize different emotions like happiness, sadness, fear, surprise and disgust (Kring and Campellone, 2012). Facial emotion perception is also necessary for social interaction. Disturbances in facial emotion perception may notably affect connection with others and hassle the everyday activities. However, psychotic symptoms, such as paranoia and delusions of persecution, may be increased as an indirect result of false emotion recognition and its interpretation, which leads to misunderstanding of the situations causing anxiety and fear (Kohler, et al., 2010; Leszczynska, 2015). The second component of social cognition is social perception, which is the understanding of social cues and contextual information of social situations (Roder et al. 2010).

People with schizophrenia have a variety of problems in perceiving social stimuli. They hold social cognitive biases that lead to wrong interpretations and may have severe consequences in the real world. They have inability to be aware of oneself and others in the social surroundings, resulting in social isolation, unemployment, inability to manage their life, and usually lack the skills to live independently (Peyroux and Franck, 2016). The explanations people give regarding the causes of positive and negative events in their lives is known as the attributional bias. It is the third component of social cognition. Patients with schizophrenia employ an "exaggerated" self serving; they distort their perception of reality or ignore negative feedback in order to preserve their ego. In other

words, people have a need to view themselves positively. This bias is usually manifested as a failure to recognize oneself as the source of mistakes, while putting the blame and responsibility on others, external or uncontrollable factors (Coalson, 2014).

### **Social cognition interventions**

The effectiveness of a variety of social cognition interventions have been subject of study since the last decades (Peyroux and Frank, 2016). Three types of interventions focus on social cognition in schizophrenia. First, the "wide interventions" based on the idea that the fundamental cognitive skills improve social functioning. In this type, one of the most well-known interventions is the Integrative Psychological Therapy (Roder et al. 2010). Second, the "targeted interventions, "which merely focus on specific components of social cognition such as Training of Affect Recognition (Fromman et al. , 2003). Finally, the "global interventions" are more recent ones that focus on all impaired components of social cognition.

### **What the paper adds**

Research into social cognition in Egypt is relatively scanty. A study of social cognition conducted by Gohar et al., (2013) recommended further efforts to maximize the benefits of social cognition interventions in order to help schizophrenic patients to acquire the skills necessary for promoting their functional recovery. As traditional drugs and psychosocial treatment in general have only a marginal impact on social functioning of patients with schizophrenia, there is an urgent need to find new treatment strategies that enable people with schizophrenia to enhance their functional abilities.

As the main researcher is from a nursing background, this kind of research will empower psychiatric nurses to help schizophrenic patients, specifically in the social domain. Moreover, such research studies will add to the body of nursing knowledge and will shade the light on the education gaps when learning about schizophrenia and on the crucial role nurses can provide to schizophrenic patients. The study has also a special value, being conducted in Egypt, a country that represents both African and Arab worlds.

So, the current study aimed at evaluating the effectiveness of social cognition intervention among Egyptian patients with schizophrenia.

## MATERIALS AND METHODS

A quasi experimental design "pre and post implementation design" was conducted to examine the effectiveness of social cognition intervention among a group of schizophrenic patients. The intervention group was compared at baseline assessment with a control group of individuals not having any psychiatric disorder, in order to determine the level of social cognition impairments among the schizophrenic patients. Randomization was not utilized in this study.

### Participants

A purposive sample of 20 patients with schizophrenia, diagnosed according to DSM-IV criteria. The patients were selected according to the study inclusion criteria: both genders, age between 19 and 55, adherence to the prescribed medications, and ability to read and write. The patients were referred by the psychiatric residents of Rakhawy Hospital for Mental Health. The diagnosis was then confirmed by the researchers, as well as by a psychiatry specialist. Patients with history of substance abuse/dependence, mental retardation, organic brain disorders, and those who have received electro-convulsive therapy (ECT) during the last month prior to collecting data were excluded. Sample size was indicated in this way because of the nature of the disease and cognitive impairment among schizophrenia patients. At the baseline assessment, the patients group was compared with a control group of 20 subjects without psychiatric illness. The control subjects were recruited from Cairo University and other governmental places. The Arabic version of the Structured Clinical Interview for DSM-IV Axis I disorder was used to exclude current or past psychiatric illness.

### Setting and period of data collection

The study was conducted in an inpatient setting at Rakhawy Hospital for Mental Health and Addiction Treatment in Egypt. The Rakhawy Hospital has been founded in 1973, and is known as the first milieu therapy hospital in the Arab world. The intervention was conducted, and the data were collected over a period of eight months.

### Instruments

1) Patients' socio-demographic and psychiatric data such as age, gender, educational background, occupation, marital status, age of onset, duration of hospitalization, course of the illness, current signs and symptoms, and current

medications data were collected by using a semi structured interview.

2) The Arabic version of the Structured Clinical Interview for DSM-IV Axis I disorder (SCID) (Hatata, 2004) was used to confirm the diagnosis of the sample group and to exclude current or past psychiatric illness of the control group.

3) Penn Emotion Recognition Test (PERT-40): A standardized test designed by Gur et al., (2002) and Kohler et al., (2003) was used for the assessment of emotion perception. It includes 40 colored photos of faces expressing four fundamental, universal emotions: anger, fear, happiness, sadness, and neutral expressions. The emotion expressions include both high and low intensity. Participants were instructed to examine a sequence of faces and identify the expressed emotion from five possible choices.

The first question of the tool was used as a practice trail in which feedback was provided. If the patient's answer is incorrect, the researcher informs him with the correct answer and is directed back to the practice trail, until a correct response is made. The average testing time is assumed to be less than five minutes. The scoring ranges from 0 to 40. The calculated reliability of this tool was 0.712.

4) Social Perception Scale: This tool was developed by Ruiz et al., (2005) to measure the social perception ability among patients with schizophrenia. It consists of four pictures that assess the following criteria: stimuli identification, interpretation of images, and title assignment. Patients were shown one photograph at a time and asked to carefully look at the picture. They were told that the same set of questions will be asked for all four pictures, and they were asked to limit their answers to what appears in the picture and not to make any assumptions. The questions asked were as follows: 1) Could you tell me what details/elements/things you can see in this picture? 2) Could you tell me what is happening in this photo, keeping in what you told me before? 3) What title can summarize the most related aspects in the picture? The patients had two minutes to answer the first question, but no time limit was given for questions 2 and 3.

The answers were written on a response sheet. A total direct score was obtained for the four photographs of all the three questions and then transformed into ratios taking into account that the maximum direct score in question one is (67), and (12) in questions two and three.

5) The Internal, Personal, and Situational Attributions Questionnaires (IPSAQ): The IPSAQ was designed by Kinderman and Bentall (1996) to assess attributional bias. It consists of 32 items describing 16 positive, and 16 negative self-referent social situations. For each situation, the patients were required to imagine an experienced situation, write down the most cause for the situation, and then categorize this cause as being either internal (due to him or herself), external-personal (due to other person), or situational (due to circumstances or chance). Three positive and three negative interdependent subscales could be calculated, representing the numbers of internal, external-personal, and situational attributions for positive and negative events. Cronbachs alpha for the subscales are between 0.70 and 0.78.

Permission to use these tools was obtained from the authors. Translation and back translation procedure was done for verifying the translation of Social Perception Scale. In this procedure, (a) the instruments were translated (English formats) into Arabic language, (b) rendered the same English formats to bilingual experts for more verification of the translation of the Arabic formats, (c) the resulting versions were back translated into the original language by other bilingual experts, and (d) minor discrepancies in the content were found and necessary modifications were done.

### Intervention

The social cognition intervention was designed in order to improve social cognition impairment among patients with schizophrenia. This intervention was administered within the framework of therapeutic group sessions. It was conducted by the main researcher and a co-researcher (resident psychologist), and was held over 15 two weekly one-hour sessions. The study was conducted on four successive groups of five patients each. The intervention consisted of three phases in which the domains of emotion perception, social perception and attributional bias were subjects of training.

-Emotion perception: This first phase of the intervention consisted of five sessions. The patients were trained on how to identify the six basic emotions: happiness, sadness, fear, surprise, anger and disgust. Recognizing emotions occurred through photographs, vignettes, videos and role play. The videos and many photographs used for the work on emotion perception were obtained from O'Reilly (2016), the author of Emotion Stimulus Set. Furthermore, exercises used for this domain were adapted from

the SocialVille training exercise (Rose et al., 2015).

-Social perception: The second phase of the intervention focused on social perception and consisted of seven sessions. The specific Integrated Psychological Therapy module (Roder et al., 2010) was used for training of social perception using ten slides. The first four slides were analyzed in the first four sessions. In each of the following sessions, the work focused on two slides. The same activities were conducted in each session except changing the picture. The sequence of sessions was designed to gradually increase the complexity of skills achievement. Repetition and practice were used in order to acquaint the patients, step by step, on how to recognize, explain, and interpret the meaning of social situation. Slides used in the intervention include different social situations from different Egyptian arena with different facial expressions of emotions.

-Attributional bias: This third phase focused on attributional bias, and consisted of three sessions. The attributional bias intervention was developed based on Metacognitive Training for Psychosis with permission from (Moritz, Woodward and MCT Study Group, 2010), in addition to Social Cognition and Interaction Training (SCIT) developed by Roberts et al., (2016). The Content validity of the intervention was assessed by four experts in psychiatric nursing and psychiatric medicine at Cairo University. Modifications were done based on their feedback.

Each session of the intervention started with a brief review of the previously covered materials and went through the personal assignment from the last session before shifting to the new topic. A session summary was provided at the end of each session to ensure the patients' understanding. If one or more patient did not understand the content of the session, it was revised in the following one.

### Procedure and ethical considerations

A primary approval to undergo the current study was granted from the Ethics Research Committee of the Faculty of Nursing at Cairo University in January 2016. After completion of the data collection process, a final approval was granted from the same committee in April 2018, after ensuring that the patients' rights have been preserved. An official permission from Rakhawy Hospital for Mental Health and Addiction

Treatment was also obtained to conduct the proposed study.

The intervention was conducted by the main researcher with the assistance of a resident psychologist working at the Rakhawy Hospital. Individual interviews were conducted with the patients before their inclusion in the research to ensure that they were eligible to take part in the study. In the initial interview, the researcher and co-researcher introduced themselves to patients and informed them about the purpose and the process of the study, in order to obtain their acceptance to participate in this research. All patients were informed that the participation in the research is voluntary and that anyone can withdraw from the study at any time without giving any reason. Confidentiality was assured through coding the data; a unique identifying number was assigned to the data collected for each patient. The main researcher was the only one having access to these information in the database.

A written informed consent was taken from each patient who was willing to participate in the research. The patients were asked to complete all the assessment tools before beginning the intervention. To evaluate the effect of the intervention, patients had to complete the Social cognition measures at the end of the intervention program.

### **Pilot study**

For the pilot study, ten patients fulfilling the inclusion criteria were recruited from the Psychiatry and Addiction Prevention Hospital of Kasr Al Ainy at Cairo University. The pilot study was conducted in order to assess the feasibility and accessibility of the sample, and to test the clarity and validity of the tools, and the time needed to respond to each questionnaire. It was also conducted to identify difficulties that may arise and need to be handled before applying the study. The pilot study revealed that the average time needed to complete the assessment ranged from 30 to 45 minutes, depending on the degree of understanding and the responses of the patient. The pilot study revealed that the setting at the Psychiatry and Addiction Prevention Hospital of Kasr Al Ainy at Cairo University was inappropriate due to the quick discharge and rapid turnover of the patients in this place, challenging the completion of the intervention as designed. So, the patients who had participated in the pilot study were excluded from the main study sample, and a decision was taken to conduct the study in the Rakhawy Hospital for Mental Health and Addiction

Treatment where the schizophrenic patients have a longer turn over.

### **Statistical Analysis**

Data were analyzed using Statistical Package for Social Sciences (SPSS), version 20. Numerical data were expressed as a mean and standard deviation. Qualitative data were expressed as frequency and percentage. Probability ( $p$ -value)  $> 0.05$  indicates non significant result,  $p$  value  $< 0.05$  is considered a significant result and  $p$ -value  $< 0.001$  is considered high. Inferential statistics paired "t" test was used to determine the differences between the pretest and post test evaluations of the same group for quantitative data.

### **RESULTS**

Analysis of the sociodemographic data revealed that the schizophrenic patients and the control group were matched for age and gender (Table 1). The majority of the schizophrenic patients and the control group were university graduates. However, both groups differed in terms of marital status, with a higher rate of single individuals among the patients group.

Figure (1) shows that the majority of the schizophrenic patients were unemployed, while the majority of the control group had administrative work.

### **Psychiatric data of the patients group**

Fifty percent of the patients received the diagnosis of paranoid schizophrenia, while (25%), (20%), and (5%) received the diagnosis of chronic undifferentiated, schizoaffective and disorganized schizophrenia respectively. Forty-five percent of the patients group suffered from schizophrenia from 10 years to less than 15 years. Furthermore, (55%) of patients were hospitalized from one month to less than 6 months, and (15%) of the study group were hospitalized from 2 to 5 years (Table 2).

Figure (2) reveals that about (50%) of the patients group were under antipsychotic drugs, in addition to mood stabilizers (lithium, or carbamazepine or sodium valporate), while (20%), of them were under atypical antipsychotics only, (15%) were under typical antipsychotics, and (15%) were under a combination of typical and atypical antipsychotic medications

**Social cognitive measures**

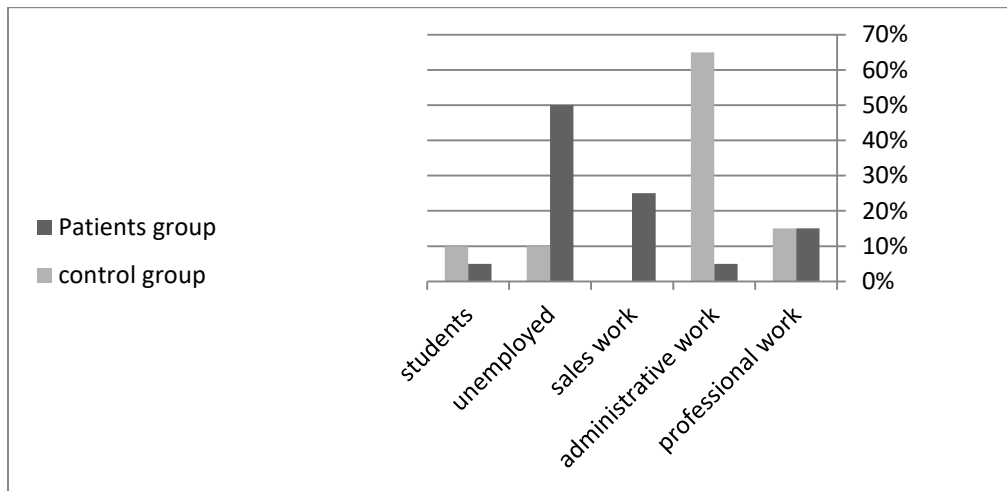
As shown in Table (3), the majority of the schizophrenic patients attended the intervention completely without missing any session.

-The control group had a higher emotion perception than the patients group, with a statistically significant difference (Table 4).

Moreover, a highly statistically significant difference was found when the social perception of the patients group was compared with that of the healthy control group. The healthy control group performed better than the patients group at baseline.

**Table (1);Socio-demographic data of the studied sample**

Item	Schizophrenic Patients (No. 20) No (%)	Control (No. 20) No (%)
<b>Age in years</b>		
19- <40	11(55)	13(65)
40-55	9(45)	7(35)
<b>Sex</b>		
Male	17(85)	14(70)
Female	3(15)	6(30)
<b>Marital status</b>		
Married	5(25)	11(55)
Single	13(65)	9(45)
Divorced	2(10)	--
<b>Education Level</b>		
Can read and write	1(5)	--
Secondary school	2(10)	4(20)
Universitygraduate	16(80)	13(65)
Post graduate	1(5)	3(15)



**Figure (1):\_Occupation of the studied sample**

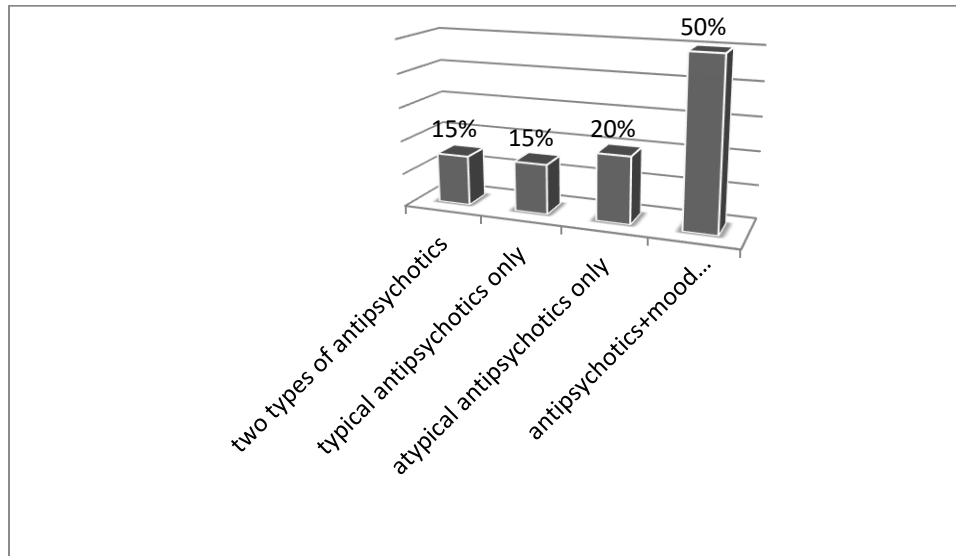


Figure (2): Psychiatric medications received by the schizophrenic patients

Table (2). Characteristics of illness in the schizophrenic patients (according to DSM-IV criteria) (n=20)

Item	No. (20)	%
<b>Classification of schizophrenia</b>		
Paranoid schizophrenia	10	50
Chronic undifferentiated	5	25
Disorganized	1	5
Schizoaffective	4	20
<b>Duration of illness</b>		
Less than 1 year	1	5
1 year-<5 years	3	15
5 years-< 10 years	7	35
10 years-< 15 years	9	45
<b>Duration of hospitalization</b>		
Less than one month	4	20
1 month-< 6 months	11	55
6 months -< one year	1	5
One year-<2 years	1	5
2 years- 5 years	3	15

**Table (3); Rate of the patients' attendance of the intervention sessions.**

	No	%
<b>Complete sessions attendance</b>	12	60
<b>Only one session absence</b>	8	40

**Table (4); Emotion and social perception: Comparison between the schizophrenic patients at baseline and the control group**

	Schizophrenic Patients	Control	t	p-value
	M±SD	M±SD		
<b>1) Emotion perception</b>				
<b>a. Gender of the character</b>	18.45±1.39	19.92±0.25	4.61	0.000
<b>b. Identifying emotions</b>	25.65±5.59	35.45±1.877	7.35	0.000
<b>c. Identifying the intensity of emotion</b>	17.6±2.96	31.5±2.54	15.86	0.000
<b>2) Social Perception</b>				
<b>a. Identifying stimuli</b>	14.35±6.84	27.10±6.98	6.21	0.000*
<b>b. Interpretation</b>	5.05±2.06	11.30±1.03	14.38	0.000*
<b>c. Assigning title</b>	1.45±1.66	6.35±2.815	8.13	0.000*

Table (5) shows a statistically significant difference regarding the emotion perception at baseline and post intervention. Similarly, comparing the social perception before and after the intervention shows a statistically significant difference.

Three positive and three negative subscale scores were calculated by summing the number of internal attribution, the number of personal attributions, and the number of situational attributions for both positive and negative events (Tables 6& 7). The externalizing bias (EB) was calculated by deducting the number of internal attributions for negative events from the number of internal attributions for positive events. A positive EB score consequently indicates strong self-serving biases (take personal credit for their desirable outcomes, while blaming external factors for their undesirable outcomes).

EB at baseline for control group: 177-106=71 (strong self serving bias).

EB at baseline for the patients group: 202-123=79 (strong self serving bias).

EB at post intervention for the patients group: 201-93=108 (strong self serving bias).

The Personalizing Bias (PB) indicates the proportion of external attributions for negative events that are personal rather than situational. It is calculated by dividing the number of personal attributions by the sum of both personal and situational attributions for negative events.

**PB = personal attribution for negative events ÷ (personal + situational attributions for negative events).**

A PB score of greater than 0.5 therefore represents a greater tendency to use personal rather than situational external attributions for negative events.

PB at baseline for control group:  $92 \div (92+122) = 0.4$  (the control group exhibits tendency to use situational rather than personal external attributions for negative events).

PB at baseline for the schizophrenic patients:  $124 \div (124+67) = 0.6$  (greater tendency to use personal rather than situational external attributions for negative events).

PB at post-intervention for the schizophrenic patients group:  $139 \div 227=0.6$  (greater tendency to use personal rather than situational external attributions for negative events). Furthermore, there was no statistically significant difference when comparing the attribution bias toward positive events in the schizophrenic patient and the control groups (Table 6). The attributional bias toward negative events was approaching significance. The baseline and post-intervention scores of the attribution bias toward positive and negative events were relatively close, showing no statistically significant difference.

**Table (5).Emotion and social perception: Comparison between pre and post-intervention scores in schizophrenic patients**

	Baseline	Post intervention	t	p-value
	M±SD	M±SD		
<b>Emotion Perception</b>				
<b>Gender of the character</b>	18.45±1.39	19.77±0.63	3.86	0.001*
<b>Identifying emotions</b>	25.65±5.59	33.05±3.83	4.89	0.000*
<b>Identifying intensity of emotions</b>	17.6±2.96	27.35±3.97	8.79	0.000*
<b>Social Perception</b>				
<b>Identifying stimuli</b>	14.35±6.84	30.80±10.11	6.02	0.000*
<b>Interpretation</b>	5.05±2.06	8.50±2.26	5.04	0.000*
<b>Assigning title</b>	1.45±1.66	6.55±3.17	6.36	0.000*

\*Statistically significant value (P<0.05)

**Table (6).Attribution bias: Comparison between the schizophrenic patients at baseline and the control group**

Attributional bias	Schizophrenic Patients		Control		t (p- value)
	No (%)	M±SD	No (%)	M±SD	
<b>Subscale of positive events</b>					
Total internal attributional bias	202 (31.6)	23.85±5.39	177(28)	26.75±4.26	2.028(0.05)
Total personal attributional bias	85(13.3)		71(11)		
Total situational attributional bias	39(6)		72(11)		
<b>Subscale of negative events</b>					
Total internal attributional bias	123 (19.2)	25.10±4.67	106(17)	28.4±5.08	1.917 (0.7)
Total personal attributional bias	124(19.4)		92(14)		
Total situational attributional bias	67(10.5)		122(19)		

**Table (7).Attributional bias: Comparison between the pre and post-intervention in patients with Schizophrenic patients**

Attributional bias	Baseline		Post intervention		t (p- value)
	No (%)	M±SD	No (%)	M±SD	
<b>Subscale of positive events</b>					
Total internal attributional bias	202 (31.6)	23.85±5.39	201 (31.4)	24.60±7.48	0.36(0.71)
Total personal attributional bias	85(13.3)		66(10.3)		
Total situational attributional bias	39(6)		53(8.3)		
<b>Subscale of negative events</b>					
Total internal attributional bias	123 (19.2)	25.10±4.67	93 (14.5)	27.45±6.32	1.335(0.19)
Total personal attributional bias	124(19.4)		139(21.7)		
Total situational attributional bias	67(10.5)		88(13.8)		

## DISCUSSION

The current study evaluates the effectiveness of the social cognition intervention among patients with schizophrenia. The intervention focused on three domains of social cognition (emotion perception, social perception, and attribution bias).

The findings reveal that the control group had the ability to identify emotions (when measuring the emotion perception) better than the patients group, which was statistically significant. Moreover, the control group had the ability to identify the intensity of emotions better than the studied schizophrenic patients.

The study findings are consistent with Chareonboon and Patumanond (2017), who indicated that people with schizophrenia performed worse than the healthy controls regarding emotion recognition. As well, in China, Li et al., (2010) used the Facial Emotion Identification Test to assess emotion perception and found a comparable deficit in emotion perception for schizophrenic patients with the effect size of 0.79.

Following the intervention, the patients group demonstrated a statistically significant improvement in recognizing emotions. Consistent with this finding, Horan et al., (2009) found that schizophrenic patients who received cognitive intervention have significant improvement in facial affect perception. In the same line, Kurtz and Richardson (2012) conducted a meta-analytic study that included 19 studies about social cognitive remediation, and concluded that social cognitive remediation programs have a moderate to large effect on emotion recognition. Furthermore, the emotion perception was usually found to improve with intervention programs, even when no changes in other social cognition areas were detected. This was found in the studies of comprehensive remediation programs that focus on emotion perception and on other dimensions, such as the theory of mind and the attribution bias (Horan et al., 2009).

As for social perception, the study findings revealed a statistically significant difference between the schizophrenic patients and the control group; the patients' group performing worse than the control one. In other words, schizophrenic patients have lower ability to make accurate social perception and to interpret emotional expressions and non-verbal communication correctly.

We used the social perception scale to

measure the cognitive abilities that are essential for social perception. During the baseline assessment, it was observed that the schizophrenic patients misinterpreted the social situations presented in the pictures. For instance, a picture showing a boy and a girl playing and laughing in a room was interpreted by most of the patients as fighting man and woman, wrestling or sexual harassment. Another picture depicting young people hurrying through a door was interpreted as a revolution, or as a crowd at the metro station. However, such interpretations might be related to the inability of the schizophrenic patients to identify the nature of relationships between individuals, and inability to gather contextual information in social settings.

Moreover, the study results reveal that following the intervention, the patients learned to gather more information from the picture (identifying stimuli), to be able to interpret the social situations presented in the pictures correctly (social interpretation), and to summarize the most important information (assigning title). Such finding is congruent with Fuentes et al., (2007) who investigated the efficacy of social perception subprogram among schizophrenic patients, and found an improvement in their social perception ability.

With reference to the attributional bias, the current study shows two main findings. First, the patients had a greater tendency to blame other people for negative events happened in their life, while individuals in the control group tend to blame circumstances rather than persons. Second, our results found no differences between the healthy control and schizophrenic patient regarding attributional style for positive events, reflecting an overall self-serving bias that is consistent with the previous work (Moritz et al. 2007). Such finding is incongruent with DeVnyder et al. (2013) who stated that, the schizophrenic patients and the healthy controls had a similar external- personalizing bias toward negative events. Among the few studies conducted in Egypt in this field, Elnakeeb et al. (2010) found that schizophrenic patients tend to blame other people for negative events, if these events are perceived to cause intentional harm.

However, our study findings are incongruent with the study of Mehl, et al., (2014) who found that schizophrenic patients showed a "self blaming" attributional style, i.e. attributing negative events to themselves. This was explained by the method used; patients were not forced to choose among internal, personal, and situational causes

but to rate the probability of these causes.

This is consistent with Aakre et al. (2009), who found that current paranoid patients were significantly more likely to use external-personal attributions when explaining negative events than the non-psychiatric controls. Contrary to our results, the authors found no evidence for the self-serving bias in both schizophrenic patients and control groups; all participants tended to show a roughly 50/50 split between internal and external attributions.

When the attributional bias toward positive and negative events was assessed before and after intervention, our findings revealed no statistically significant difference. In other words, the intervention had no effect on the attribution bias; the patients kept their personalizing and externalizing bias. This result is consistent with a meta-analysis study conducted by Kurtz and Richardson (2012), which investigated the effect of social cognitive training on attributional style in people with schizophrenia among different studies conducted in this field and found no significant effect of the training on attribution.

Studying the effect of social cognitive skills training on attribution bias, Horan et al., (2011) found no statistical significance difference of the attribution before and after the training. However, when the authors combined social cognitive skills training with neurocognitive remediation, a significant improvement in the attribution bias domain was found. On the other hand, Peyroux and Frank (2016) conducted an individualized social cognitive remediation on two patients with schizophrenia, one of them showed a significant attributional style improvement after conducting the training.

Although the outcome of the study intervention is encouraging as regards the emotion and social perception, the attributional bias intervention has no effect. This may be due to many reasons. First the emotion perception and social perception domains received the greatest amount of training, time, and a lot of activities were done, but a few numbers of sessions were designed for attribution bias. Second, during conducting the intervention, we observed that the attribution bias was strongly connected with the delusion of persecution and suspiciousness. For instance, many patients attribute positive events to their delusion of grandeur, and attribute negative events to their delusion of persecution. Such pathological attribution may underlie the resistance to change in this domain.

Generally, the study results carry a promising

potential value in improving the social cognition outcomes among the schizophrenic patients. Moreover, with consideration of this special population's need of all mental health professionals input to get the best outcome, the emphasis put on the role of psychiatric nursing, as part of the therapeutic team in the recovery process of schizophrenic patients is one of the points of strength of the current study. As Egypt is one of the countries that suffer from marginalization of the nursing role in the psychiatric field, the latest point has an added meaningful significance and value.

However, the study has also some limitations that need to be addressed in future studies. Due to the reduced numbers of schizophrenic patients fulfilling both inclusion and exclusion criteria of research, the sample were selected with no randomization. Moreover, the participating patients were under antipsychotic medications with or without mood stabilizers which may affect performance in social cognition. Another limitation was found in the third domain of the intervention, "the attribution bias." Three sessions seemed not to be enough for reaching the targeted improvement in this domain; so, increasing the number of sessions in future studies would add to the understanding of this specific finding in the current study.

## CONCLUSION

Patients with schizophrenia have a poor social cognition (worse emotion and social perception), when compared with the non-mentally-ill control group. Both schizophrenic and control groups have a strong self-serving bias; assigning self credit for positive events, while blaming external factors for their negative events. However, the schizophrenic patients tend to blame other people while the non-mentally-ill individuals tend to blame circumstances rather than people.

Schizophrenic patients' emotion perception and social perception abilities improved following intervention program, supporting the beneficial effect of intervention on improving social cognition impairment in schizophrenia. However, attribution bias was not affected following the intervention. Further research is needed to get expansive enhancement in social cognition and generalization of such interventions.

## CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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## AUTHOR CONTRIBUTIONS

AMA wrote the research, designed and applied the intervention, made data entry and undergone all legal procedures related to the research. EAK and MYR supervised the research and revised the manuscript. MYR keep an eye on each piece of the research and supervised the application of the intervention moment by moment. ZAO revised the theoretical part of the research. ZMA analyzed statistics of the research as well as edited it. AMH collected with AMA the pre and post test measures as well as applied the intervention. . All authors read and approved the final version.

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