

Attachment Style and Reality-Testing Impairment Among Patients with Schizophrenia: A Descriptive Correlational Study.

Eman Saad Helyel⁽¹⁾, Sanaa Abd-El-Aziz Emam⁽²⁾, Mona Metwally El-Sayed⁽³⁾

(1) Demonstrator – Psychiatric Nursing & Mental Health, Faculty of Nursing, Damanhour University, Egypt.

(2) Professor of Psychiatric Nursing & Mental Health, Faculty of Nursing, Alexandria University, Egypt.

(3) Assistant Professor of Psychiatric Nursing & Mental Health, Faculty of Nursing, Alexandria University, Egypt.

Corresponding Author: Mona Metwally El-Sayed

Email: mona.mohamed24410@gmial.com.

Abstract

Background: Insecure attachment styles are an area of research that is currently receiving much attention because it has an important role in developing many psychological disorders and might have an effect on an individual's perception of his outer reality. In this respect, assessment of attachment styles among patients with schizophrenia can be informative in indicating how well the patients perceive their reality accurately. **Aim:** This study aimed to determine the attachment style and reality testing impairment among patients with schizophrenia. As well, investigate the relationship between them among those patients. **Setting:** This study was conducted at El-Maamoura hospital for Psychiatric Medicine in Alexandria. **Subjects:** A representative sample of 200 randomly recruited patients with schizophrenia were the subjects of the present study. **Tools:** A Socio-Demographic and Clinical Data Sheet, Bell Reality Testing Inventory (BRTI), and The Psychosis Attachment Measure (PAM). **Results:** The study showed that 54.5% of the studied patients exhibited an avoidant attachment style and the patients who exhibited an anxious attachment style constitute 40%. Moreover, 60% of the studied patients had a moderate level of reality-testing impairment and 36.5% had severe impairment. A statistically significant positive correlation between psychotic attachment styles and reality-testing impairment was found ($r=0.394$, $p=0.000$). More specifically, there was a statistically significant positive correlation between the avoidant attachment style and the three domains of reality-testing impairment as well as the total scores ($r= 0.577$, 0.179 , 0.278 , 0.501 respectively, were $p=0.000$). Meanwhile, a statistically significant positive correlation between the anxious attachment style was found only with the Hallucinations & Delusions domain of reality-testing impairment ($r =0.291$, $p=0.000$). **Conclusion:** It can be concluded that almost all patients with schizophrenia exhibit insecure attachment styles, with avoidant attachment style being the most prevalent, usually at a severe level in the majority of cases. On the other hand, the great majority of these same patients present with reality-testing impairment reflected in its three domains: reality distortion, the uncertainty of perception, and hallucinations & delusions. Evidence of a correlation between attachment styles and reality testing impairment, (both of the total and sub-total domains) in these patients usually and frequently there. **Recommendations:** Building up a secure, structured, and consistent environment for patients with schizophrenia to modify their insecure attachment styles and hope to become more reality-oriented.

Keywords: Attachment Style, Reality Testing Impairment and Schizophrenia.

Introduction:

Schizophrenia is a serious chronic brain disorder in which there are fundamental alterations of thinking, perception, and affect that can be either inappropriate or blunted. Motivation, communication, social and cognitive functions are also distorted in schizophrenia (Brenner, 1974; Arango & Carpenter, 2011). Schizophrenia is viewed as a syndrome with multiple interacting genetic and environmental causes. It affects about 1% of

the population worldwide and starts typically in adolescence or early adulthood. Therefore, it is considered one of the leading causes of health load in the world and one of the costliest mental disorders into both levels of human suffering and societal expenditure (Arango & Carpenter, 2011; Kuipers et al., 2014).

The neural diathesis-stress model emphasizes that psychosocial stress such as migration, experiencing discrimination, low socioeconomic status, and childhood trauma can increase individuals' vulnerability and

triggers the symptoms of schizophrenia. In this respect, previous research reported that childhood trauma can neurobiological effects on the endocrine system and the epigenetic mechanisms as well (Cheng et al., 2016). Early emotional trauma, as child abuse or parental separation, was found to be one of the main problems that result in the development of an insecure attachment style. Recent studies posted that childhood trauma can lead to biological brain changes, such as reduced whole brain volume and increased amygdala-to-whole brain volume ratio (Corcoran & McNulty, 2018). These brain changes are thought to induce disturbances in the perception of reality among patients with schizophrenia (Kvrgic et al., 2012).

Speaking of attachment, it is the emotional bond that forms between two individuals in early life and is considered as an evolutionary mechanism that enhances survival (Gutiérrez, 2018). According to attachment theory, early experiences and interactions with attachment figures lead a child to build up internal working models or concepts of self and others. Fundamentally, when an infant is in distress, a caregiver's response whether present and consistent or absent and inconsistent influences the infant's view of his worthiness of receiving attention and the trustworthiness of the attachment figures (Shaver et al., 1996; Sherman et al., 2015).

Individuals with a positive working model of self, view themselves as secure, loveable, and high in self-worth. On the other hand, those with a negative self-model, view themselves as insecure, unlovable, and low in self-worth and confidence. Three different attachment patterns have been documented; the secure, insecure-avoidant, and insecure anxious/ ambivalent (Ainsworth, Blehar, Waters & Wall, 1978; Corcoran & McNulty, 2018). Individuals with a secure attachment pattern are capable of using their attachment figure as a 'secure base' for exploration and facing distressing times. Meanwhile, in the insecure-avoidant attachment pattern, people explore the environment with little direction to their caregivers. Those individuals often had learned to inhibit attachment behaviors, as these had been consistently ineffective in eliciting care from the attachment figure.

Furthermore, individuals with anxious ambivalent attachment patterns, display minimal exploration. They are highly distressed by separations and hard to relieve on reunions, displaying an ambivalent mixture of clinging behavior and anger. Those individuals appear to have caregivers who were inconsistent in their responses, and that they had learned to exaggerate their negative effect to have their needs met (Saha et al., 2007; Levy et al., 2011; Petriglieri & Obodaru, 2016; Capuano, 2020).

In conclusion, insecure attachment styles are considered one of the main factors that can lead to psychopathology in adults. Empirical evidence reported a high prevalence of insecure attachment styles in individuals with schizophrenia. Some studies found that patients with schizophrenia who had an avoidant attachment style accounted for about 85%. As feeling rejection at an early age had generated a disturbed image of oneself, others, and the perception of the world (Platts et al., 2002; Kvrgic et al., 2012).

As a result of this insecure attachment, individuals become unable to regulate their responses to stressful situations which could generate their first psychotic outbreak. High levels of insecurity can induce auditory hallucinations, paranoid delusions, and loss of ego boundaries (Olbert et al., 2016). In that sense, patients with insecure attachment can have weak ego-boundaries that may interfere with an accurate perception of reality and the ability to differentiate between the internal and external world, which is called *impaired reality-testing* (Olbert et al., 2016).

Reality testing is a concept firstly introduced in the psychoanalytic theory. It is recognized as one of the ego functions that enable the individual to distinguish between the external and internal world. People with schizophrenia had different degrees of loss of contact with reality. They lose the ability to evaluate the external environment and differentiate it from their internal world. These disturbances in reality testing can induce symptoms such as hallucinations, delusional beliefs, or personality changes. As well, these experiences may be associated with unusual behavior or difficulty with social interaction

and day-to-day functioning (Ringer et al., 2014; Olbert et al., 2016).

Reality testing in general is manifested through three spheres; *Reality Distortion*, *Uncertainty of Perception* as well as *Delusions and Hallucinations*. **The Reality Distortion sphere** determines to what extent the individual can know what is real or what is fantasy (Bell et al., 2001). It is experienced by some psychotic features as a delusion of persecution, grandeur, and delusion of control or influence. It can be marked by passivity phenomena as thought insertion, thought withdrawal, and/or thought broadcasting. Depressive delusion is also a main feature of reality distortion. **The Uncertainty of Perception sphere** describes the degree of accuracy of the individual's perception in both his and other person's behaviors. Poor Judgment, disturbed insight, ambivalence, denial, and indecisiveness are also features of this sphere. The last sphere is **Hallucinations and Delusions**, which replicate severe collapse in both reality and ego functions. It is explained through the presence of hallucinations and delusions in the form of hearing voices or seeing visions. Paranoid delusions of various types are included in this sphere of *reality* testing (Bell et al., 2001; Oppenheim, 2013).

From this perspective, people with schizophrenia who have different insecure attachment patterns (i.e., anxiety and avoidance patterns) may have different degrees of reality-testing impairment, to manage their life difficulties. Based on that, it is very important to the psychiatric nurses to identify the attachment style of their patients and their degree of reality-testing impairment. Such information can help those patients with insecure attachment styles to understand how past experiences with caregivers or significant others have formed their degree of reality impairment. As well, how these patterns work to protect them at first but later contribute to their experiences of distress. Besides, understanding such relationships can help nurses support patients to find alternative ways to meet their unmet needs and learn how to cope with dysfunction in their daily life and modify their dysfunctional or ineffective strategies. As a result, the negative and positive symptoms of those patients may be improved,

their engagement in services can increase, their drug compliance is enhanced, and their relapse reduced (Bell et al., 2001; Korver-Nieberg et al., 2013; Quijada et al., 2015; Glazebrook et al., 2016).

In this context, the present study aimed to

Determine the attachment style and reality-testing impairment among patients with schizophrenia. As well, investigate the relationship between them among those patients.

Research question

- What is the relationship between attachment style and reality testing impairment among patients with schizophrenia?

Materials and Method

Materials

Research Design: A descriptive correlational design was utilized for this study.

Setting: The study was conducted at EL-Maamoura Hospital for Psychiatric Medicine, in Alexandria. The hospital is affiliated with the Ministry of Health and population. Twenty-four wards, with a total number of 948 beds founded in the hospital. Out of the twenty-four wards of the hospital, ten wards are for psychotic patients which contain about 355 patients at one point of time with schizophrenia (as counted by the researcher). These wards include four gratis and two private wards for males and two gratis and two private wards for females.

Subjects: The EPI INFO program was used to estimate the sample size based on using 5% acceptable error, 95% confidence coefficient, 50% expected frequency. The program revealed that the minimum sample size should be 184 in-patients with schizophrenia. Thus, this study was carried out on 200 inpatients with schizophrenia. Subjects were considered eligible to participate in the study if they met the following criteria, diagnosed with schizophrenia with no comorbidity, after one week of admission, aged from 20-50 years (to avoid the impact of aging), and able to

communicate in a coherent and relevant manner. The study subjects were selected through **simple ward randomization and ranking**.

The Study Tools: Three tools were used for data collection:

The tool I: A Socio-Demographic and Clinical Datasheet:

The tool covers the patient's socio-demographic data such as age, sex, educational level, residence. Patient's clinical data as, duration of illness, age of onset of illness, length of hospital stay, number of previous psychiatric hospitalization, symptoms on admission, and medication is presently taken were also elicited by this tool.

Tool II: Bell Reality-Testing Inventory (BRTI):

The BRIT was developed by (Bell, Billington & Becker, 1985). It was used to accurately identify internal and external reality experiences. The scale is a standardized self-administrated inventory that consists of 45 true or false statements distributed over three subscales including "Reality Distortion", "Uncertainty of Perception", and "Hallucination and Delusion". Reality Distortion subscale consists of 13 true or false statements and covers disturbance in perception of external reality and fantasy such as delusions of influence, thought withdrawal/broadcasting, depressive beliefs, and/or paranoid beliefs. It also captures confusion in the person's feelings and feelings of others. The uncertainty of perception subscale contains 27 true or false statements that reflect a person's doubt about the accuracy of his perception. These include suspiciousness in his behaviors and feelings, as well as the behaviors and feelings of others. Finally, the Hallucinations and Delusions subscale contains 5 true or false statements that involve a severe breakdown in reality-testing in the form of the presence of hallucinations and delusions (Greig et al., 2000; Bell et al., 2001).

All the 45-inventory statements are rated as (0) for a false statement or (1) for the right ones. Thus, the total BRTI score ranged between 0- 45. Scores from 0-14 indicate mild reality-testing impairment, scores

from 15-29 demonstrate moderate impairment, and scores from 30-45 reflect severe reality-testing impairment. BRTI showed good to excellent levels of split-half reliability, Cronbach's alpha ranged from .78 to .90 (Hansen et al., 2012).

Tool III: The Psychosis Attachment Measure (PAM)

The Psychosis Attachment Measure (PAM) was developed by (Berry, Wearden, Barrowclough & Liversidge, 2006) and adapted for use in samples of people with psychosis. It is a standardized self-reported questionnaire and is used to assess attachment style in a patient with schizophrenia. The PAM consists of 16 items, with eight items assessing avoidant attachment and eight items assessing anxious attachment specifically in patients suffering from psychotic experiences. A four-point Likert type scale ranging from 0 (not at all) to 3 (very much) was used to score each item. Each dimension's total score was obtained via averaging individual item scores, with higher scores reflecting higher levels of anxiety and avoidance attachment styles. To measure whether patients exhibited either a highly anxious or avoidant attachment style, it was calculated by the difference between the anxiety and avoidance attachment style subscales.

The score of **Avoidant attachment style** was ranging (0-24) and **Anxious attachment style** was ranging (0-24), while the **Balanced attachment style** (equal scoring on both subscales) ranged (0-48). The scale reveals acceptable reliability for the two subscales, attachment anxiety (Cronbach's $\alpha = .82$) and attachment avoidance (Cronbach's $\alpha = .76$) (Kvrgic et al., 2012; Olbert et al., 2016).

Method: The study was accomplished as follows:

- Written official approval to conduct the study was obtained from the responsible authorities, The Research and Ethical Committee Faculty of Nursing Alexandria University. As well, the General Secretariat for Mental Health, Ministry of Health in Cairo, and the director of the hospital for Psychiatric Medicine.

- Tool (I) the socio-demographic and clinical data sheet was developed by the researcher.
- Arabic translation of the study tools II (BRTI) and III (PAM) was done by the researcher, then the translation was reviewed by two bilingual experts in the field of Psychiatric Nursing and mental health.
- The study tools were presented to a jury composed of five experts in the field of Psychiatric Nursing and Mental Health, to examine the face and content validity of the tools. The study tools were examined to evaluate its relevance and appropriateness to measure what it is supposed to measure. Tools proved to be valid.
- **The reliability** of the study tools was performed on 10 inpatients with schizophrenia by using Cronbach's alpha coefficient to test their internal consistency. They proved to be reliable, the internal consistency of the **BRTI** was ranged from $\alpha=.78$ to $.90$ and **PAM** was $\alpha=.79$ for anxious attachment and $.76$ for avoidant attachment.
- **A pilot study** was carried out on 15 inpatients with schizophrenia to ascertain the clarity and applicability of the study tools and to identify obstacles that might be faced during data collection. The pilot study revealed that study tools were clear, understood, and applicable.
- The purpose of the study was explained to the responsible persons of each randomly selected ward to gain their cooperation.
- The patients' charts in the first ranked ward were screened consider the predetermined inclusion criteria of the selected patients. All the suitable patients were recruited then each patient met on an individual basis, the first relationship is established, the aim of the study was explained, and informed consent is secured.
- Each patient was interviewed one to two times to obtain all the required data. Each interview lasted from 20-25 minutes according to the patient's attention, concentration, and level of understanding.
- The process of data collection continued to the 2nd ranked ward and so on until the required number of subjects was completed.
- The data were collected over six months, starting from April 2020 until September 2020.

Data collection:

- **Simple ward randomization and ranking sampling technique** were used to collect a representative sample of an inpatient with schizophrenia.
- The wards were randomly selected and ranked by choosing from a pool for inclusion in the study. The selected ranked wards were private male, free male (A), private female, private male, free male (B), free female, and finally free male. These wards were revisited in the same order several times until the targeted sample size was obtained.

Ethical Considerations

- Informed written consent to participate in the study was obtained from the patients and their guardians after explanation the aim of the study. This was done throughout the study steps.
- Data confidentiality was assured and respected.
- The patients' privacy and anonymity were considered and respected through the interview.
- The patient's right to withdraw was allowed and respected.

Indentations and Equations

- Data were coded, computerized, and then analyzed using the Statistical Package for Social Science (SPSS) version 25.0.
- The presentation of Qualitative data was done through percentages and numbers.
- Data of quantitative nature were displayed by the range, mean, and standard deviation.

- The significance of the obtained results was judged at the 5% level.
- The reliability of tools was assessed using **Cronbach's alpha test**.
- Many tests were utilized such as **the Chi-square test** to compare between different groups concerning categorical variables **and the Pearson correlation coefficient (r.)** to correlate between two quantitative variables. Further, the **ANOVA test** for the multivariate analysis and a **student t-test** for the bivariate.

Results

Table (1): shows the socio-demographic characteristics of the studied patients with schizophrenia. The table indicates that the age of the studied patients ranged from 20–50 yrs. with a mean age of 36.93 ± 9.815 yrs. It can be observed that 31.5% of the studied patients were in the age group ranging from 20 to less than 30 yrs., and those in the age group ranging from 40 to 50 yrs. amounted to 41.5%. It appears that 59% of the studied patients were males and 70% were living in urban areas. As regards the marital status, more than half of them (57.5%) were single, 32% were married, while 10.5% were divorced or separated including 2% were widowed. As for the educational level, about half of the studied patients (51.5%) had a basic education, 37.5% of them had a secondary education, while only 11% had a university education. Regarding their employment status, 20.5% of them were governmental employees, 40.5% working as craft and commercial workers, while 36.5% were housewives and only 2.5% were students.

Table (2): presents the clinical characteristics of studied patients with schizophrenia. The age at onset of disease ranged between 15-35 yrs. with a mean of 20.49 ± 4.701 in the present subjects. It is obvious that 47.5% of the studied patients suffered from schizophrenia since their teenage (15 to less than 20 yrs.) and 36% of them at age of 20 to less than 25 yrs. Speaking of the psychiatric hospital ward type, more than half of the studied patients (60.5%) were residents in free wards and 39.5% of them were in paid/private wards. Regarding the

frequency of psychiatric hospitalization, the mean score of the frequency of psychiatric hospitalization was 6.989 ± 6.299 times, nearly half of them (48.5%) were previously hospitalized less than 5 times, 29% were hospitalized between 5 to less than 10 times, and 22.5% were hospitalized for 10 to 15 times. All the studied patients (100%) received psychotropic medications and 48.5% of them received ECT sessions as well.

Table (3): reveals the distribution of the studied patients according to their psychotic attachment styles. It appears that the mean score of the total psychotic attachment styles was 33.54 ± 6.161 with scores ranging from 21- 45. It can be noted that more than half (54.5%) of the studied patients with schizophrenia had an avoidant attachment style, with a mean score of 17.01 ± 3.713 . Meanwhile, the patients who had an anxious attachment style constitute 40%, with mean scores of 16.53 ± 4.197 . It is worth mentioning here that 5.5% of patients scored equally on both subscales; exhibited a balanced attachment style.

Table (4): demonstrates the distribution of the studied patients according to their level of reality-testing impairment. It can be noted that 60% of the studied patients with schizophrenia had a moderate level on the total reality-testing impairment scale, while 36.5% had a severe impairment and only 3.5% of them had a mild level (also reflected in figure 2), with a mean score of 26.63 ± 5.829 . Concerning the three domains of reality-testing impairment; it can be observed that none of the subjects had a mild level of Uncertainty of Perception, 59.5% had a moderate level and 40.5% had a severe level, with a mean score of 15.95 ± 3.712 . As for Reality Distortion, about three-quarters (74.5%) of the studied patients had a moderate level of reality distortion, while 20% had a severe level and only 5.5% had a mild reality distortion, with a mean score of 7.165 ± 2.453 . Regarding the last domain, Delusions, and Hallucinations, 77% of the studied patients had a severe level of delusions and hallucinations, meanwhile, 14.5% had a moderate level and only 8.5% had a mild level, with a mean score of 3.520 ± 1.211 .

Table (5): presents the relationship between the dimensions of reality-testing impairment and psychotic attachment styles. The table reveals that there is a statistically significant positive correlation between the total scores of psychotic attachment styles and reality-testing impairment ($r=0.394$, $p=0.000$). Moreover, a statistically significant positive correlation was found between the total scores of psychotic attachment style and each of uncertainty of perception, and hallucinations & delusions domains of reality-testing impairment ($r=0.428$ and 0.366 respectively, $p=0.000$). A statistically significant positive correlation between the avoidant attachment style and the three domains of reality-testing impairment as well as the total scores ($r= 0.577, 0.179, 0.278, 0.501$ respectively, $p=0.000$).

Meanwhile, a statistically significant positive correlation between the anxious attachment style was only with the Hallucinations & Delusions domain of reality-testing impairment ($r=0.291$, $p=0.000$).

Table (6): illustrates the relationship between psychotic attachment total scores and socio-demographic & clinical characteristics of the studied patients. It can be seen that the total mean score of psychotic attachment among female patients (35.15 ± 5.986) was higher compared to that of male patients (32.41 ± 6.056) with a statistically significant difference ($t= 9.933$, $P=0.002$). Regarding marital status, a statistically significant difference between the total scores of psychotic attachment as a function of marital status ($F= 3.385$, $p=0.019$). The highest mean score was recorded by the divorced patients (36.81 ± 3.572), compared to a single (33.79 ± 6.284) and married patient (32.11 ± 6.402).

As for the level of education, there is a statistically significant difference between the total mean score of psychotic attachment styles due to the patient's level of education ($F=11.390$, $P=0.000$). It can be noted that with the increased patients' level of education, the level of insecure attachment decreases. Yet, the studied patients who only had basic education scored (35.27 ± 4.971) while those who had university level of education scored

(29.45 ± 5.902). Concerning work status, a statistically significant difference ($F=12.598$, $p=0.000$) was found because of work status. The governmental employee, craft and commercial workers, and housewives scored the highest means scores (34.76 ± 4.305 , 32.54 ± 6.183 , and 33.82 ± 4.068 respectively) compared to the student patients (21.00 ± 0.000).

Regarding the clinical data, the same table shows a statistically significant difference in patient's psychotic attachment scores related to their frequency of hospitalization ($F= 7.623$, $P=0.000$). It can be observed that the highest mean score was recorded for those who were admitted to the hospital 10 times or more (38.38 ± 3.955) compared to those who were less frequently hospitalized (33.95 ± 6.023 , and 30.65 ± 6.109).

Table (7): presents the relationship between reality-testing impairment total scores and basic socio-demographic and clinical data of the studied patients. The table indicates that there is a statistically significant difference between reality-testing impairment regarding the patient's age ($F=12.277$, $P=0.000$). The severity of reality-testing is highest in patients who were in the age group ranging from 40-50 yrs. (28.33 ± 6.224) compared to those who were in the age group ranging from 30-40 yrs. (27.00 ± 4.188) and those patients who are before 30 yrs. (26.71 ± 4.699). As for sex, it is obvious that the total mean scores of reality-testing impairment were higher in males (27.60 ± 4.899) compared to that of females (25.23 ± 6.743) with a statistically significant difference ($t=8.289$, $P=0.004$). Further, a statistically significant difference between reality-testing impairment due to marital status ($F= 8.958$, $p=0.000$). Single patients had a severe level of reality-testing impairment (28.08 ± 4.652) compared to married and divorced patients (25.82 ± 6.592 and 21.57 ± 6.439) respectively.

Nevertheless, according to clinical characteristics of the studied patients, a statistically significant difference between the total mean score of reality-testing impairment due to the age of onset of the disease ($F=10.236$, $p=0.000$). The highest mean scores were recorded by patients who suffered from

the illness at the age group 15-20 yrs., 20-25 yrs. and less than thirty (27.35 ± 5.611 , 27.04 ± 5.725 , and 27.44 ± 1.616 respectively) compared to those who had the age of onset of the disease from 30-35 yrs. (19.13 ± 6.069).

Table (1): Distribution of the studied patients according to their socio-demographic characteristics.

Socio-demographic characteristics		Total N=200	
		No.	%
Age (yrs.)			
▪ 20-		63	31.5
▪ 30-		54	27.0
▪ 40-50		83	41.5
Min – Max	20 – 50	Mean ± SD 36.93±9.815	
Sex			
▪ Male		118	59.0
▪ Female		82	41.0
Place of residence			
▪ Rural		60	30.0
▪ Urban		140	70.0
Marital status			
▪ Single		115	57.5
▪ Married		64	32.0
▪ Divorced/Separated (including 2% widowed)		21	10.5
Educational qualifications			
▪ Basic education		103	51.5
▪ Secondary/ technical education		75	37.5
▪ University education		22	11.0
Employment status/ Job			
▪ Students		5	2.5
▪ Governmental employee		41	20.5
▪ Craft and commercial workers		81	40.5
▪ Housewives		73	36.5

Table (2): Distribution of the studied patients according to their clinical data.

Clinical Data		Total N=200	
		No.	%
Age at the onset of the disease			
▪ 15-		95	47.5
▪ 20-		72	36.0
▪ 25-		18	9.0
▪ 30-35		15	7.5
Min – Max	15-35	Mean ± SD 20.49±4.701	
The psychiatric hospital ward type			
Paid/grades		79	39.5
Free		121	60.5
Frequency of hospitalization			
▪ <5		97	48.5
▪ 5-		58	29.0
▪ 10- 15		45	22.5
Min – Max	1-15	Mean ± SD 6.989±6.299	
Treatment			
▪ Psychotropic medications		200	100.0
▪ *ECT sessions		97	48.5

*More than one response was given.

Table (3): Distribution of the studied patients according to their Psychotic Attachment Styles: (Quantitative analysis).

Psychotic Attachment Styles	Frequency		Range and Mean	
	No.	%	Min- Max	Mean ± SD
Avoidant attachment style Range (0-24)	109	54.5%	10-23	17.01 ± 3.713
Anxious attachment style Range (0-24)	80	40%	8-23	16.53 ± 4.197
* Balanced attachment style Range (0-48)	11	5.5	38-42	39.82 ± 2.09
Total of Psychotic Attachment Styles Range (0-48)	200	100%	21-45	33.54 ± 6.161

* a balanced attachment style; equal scoring on both subscales.

Table (4): Distribution of the studied patients according to their level of Reality-Testing impairment.

Domains of Reality-Testing Impairment	Levels of Reality-Testing Impairment						Min- Max	Mean ± SD
	Mild		Moderate		Severe			
	No.	%	No.	%	No.	%		
Uncertainty of Perception Range (0-27)	0	0.0	119	59.5	81	40.5	9-23	15.95 ± 3.712
Reality Distortion Range (0-13)	11	5.5	149	74.5	40	20.0	2-12	7.165 ± 2.453
Delusions & Hallucinations Range (0-5)	17	8.5	29	14.5	154	77.0	1-5	3.520 ± 1.211
Total of Reality-Testing Impairment Range (0-45)	7	3.5	120	60.0	73	36.5	13-37	26.63 ± 5.829

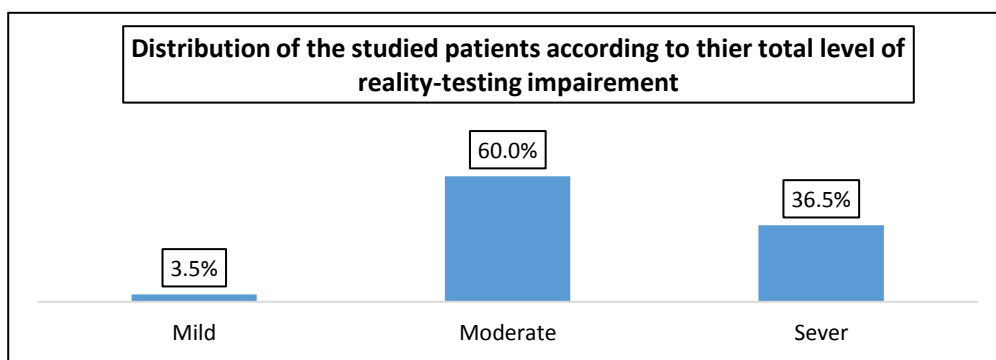


Figure (1): Distribution of the studied patients according to their levels of Reality-Testing Impairment:

Table (5): Correlation Matrix between the domains of reality impairment and psychotic attachment styles (Pearson correlation).

Dimensions		Uncertainty of Perception	Reality Distortion	Hallucination & Delusion	Total of Reality-Testing Impairment
Avoidant attachment	r	0.577	0.179	0.278	0.501
	P	0.000*	0.011*	0.000*	0.000*
Anxious attachment	r	0.117	0.002	0.291	0.136
	P	0.098	0.980	0.000*	0.055
Total of Psychotic Attachment Styles	r	0.428	0.109	0.366	0.394
	P	0.000*	0.125	0.000*	0.000*

r = Pearson correlation * Significant p value at ≤0.05 r ≥0.9 very high correlation r 0.7-<0.9 high correlation r 0.5-<0.7 moderate correlation r < 0.5 low correlation

Table (6): The relationship between the Psychotic Attachment Styles and the socio-demographic and clinical characteristics of the studied patients.

Socio-demographic and clinical data	Mean Scores of Psychotic Attachment Styles	Test of significance
	Mean \pm S. D	
Age		
▪ 20-	32.63 \pm 6.998	F=0.902 P=0.441
▪ 30-	33.75 \pm 6.933	
▪ 40-50	33.76 \pm 4.986	
Sex		
▪ Male	32.41 \pm 6.056	t= 9.933 P=0.002*
▪ Female	35.15 \pm 5.986	
Marital status		
▪ Single	33.79 \pm 6.284	F= 3.385 P=0.019*
▪ Married	32.11 \pm 6.402	
▪ Divorced/Separated	36.81 \pm 3.572	
Level of education		
▪ Basic	35.27 \pm 4.971	F= 11.390 P=0.000*
▪ Secondary/ technical education	32.35 \pm 6.896	
▪ University	29.45 \pm 5.902	
Working status		
▪ Students	21.00 \pm 0.000	F= 12.598 P=0.000*
▪ Governmental employee	34.76 \pm 4.305	
▪ Craft and commercial workers	32.54 \pm 6.183	
▪ Housewives	33.82 \pm 4.068	
Clinical Data		
Age at the disease onset		
▪ 15-	32.89 \pm 6.644	F= 0.703 P=0.551
▪ 20-	34.18 \pm 6.194	
▪ 25-	34.33 \pm 5.401	
▪ 30-35	33.53 \pm 2.722	
Frequency of hospitalization of the disease		
▪ <5	33.95 \pm 6.023	F= 7.623 P=0.000*
▪ 5-	30.65 \pm 6.109	
▪ 10-15	38.38 \pm 3.955	

F= ANOVA Test t= Student t-Test * Statistically significant p-value at ≤ 0.05 .

Table (7): The relationship between reality-testing impairment and socio-demographic and clinical characteristics of the studied patients.

Socio-demographic & Clinical Characteristics	Mean Scores of Reality-Testing Impairment	Test of significance
	Mean \pm S. D	
Age		
▪ 20-	26.71 \pm 4.699	F=12.277 P=0.000*
▪ 30-	27.00 \pm 4.188	
▪ 40-50	28.33 \pm 6.224	
Sex		
▪ Male	27.60 \pm 4.899	t= 8.289 P=0.004*
▪ Female	25.23 \pm 6.743	
Marital status		
▪ Single	28.08 \pm 4.652	F= 8.958 P=0.000*
▪ Married	25.82 \pm 6.592	
▪ Divorced/Separated	21.57 \pm 6.439	
Level of education		
▪ Basic	27.29 \pm 6.035	F= 2.700 P=0.070
▪ Secondary/ technical education	25.41 \pm 5.497	
▪ University	27.68 \pm 5.481	
Working status		

Socio-demographic & Clinical Characteristics	Mean Scores of Reality-Testing Impairment	Test of significance
	Mean \pm S. D	
<ul style="list-style-type: none"> ▪ Students ▪ Governmental employee ▪ Craft and commercial workers ▪ Housewives 	25.00 \pm 0.001 27.15 \pm 7.732 26.96 \pm 4.684 26.37 \pm 8.035	F= 0.476 P=0.753
Clinical Data		
Age at the disease onset		
<ul style="list-style-type: none"> ▪ 15- ▪ 20- ▪ 25- ▪ 30-35 	27.35 \pm 5.611 27.04 \pm 5.725 27.44 \pm 1.616 19.13 \pm 6.069	F= 10.236 P=0.000*
Frequency of hospitalization of the disease		
<ul style="list-style-type: none"> ▪ <5 ▪ 5- ▪ 10-15 	26.57 \pm 4.811 25.59 \pm 7.989 27.66 \pm 3.022	F= 1.262 P=0.286

F= ANOVA Test t= Student t-test * Statistically significant value p at ≤ 0.05 .

Discussion

The ability to formulate attachments with other human beings is a necessary skill that typically begins early in life. The parent/caregiver–child relationship is the first vital relationship that an infant forms and the security build-up in this relationship has a profound effect on the child's mental, emotional, and social development. Early insecure (avoidant or anxious) attachment styles could affect the ability of an individual to distinguish between his inner wishes and outer reality (Corcoran & McNulty, 2018). Impairments in reality testing have been shown in patients with schizophrenia and demonstrated in the form of reality distortion, disturbance in perception, delusions, and hallucinations. This has been regarded as a cornerstone of schizophrenia and it was suggested that this impairment may be caused by insecure attachment between both child and parent in their early relationship (Hansen et al., 2012). Therefore, this study aimed to determine the attachment style and reality testing impairment among patients with schizophrenia and investigate the relationship between them in those patients.

The findings of the present study generally showed the prevalence of insecure attachment style among patients with schizophrenia. Within the insecure attachment, the avoidant type was the more prevailing

among these patients followed by the anxious type. While avoidant attachment prevailed in 54.5%, 40% of the studied patients were having an anxious type of attachment. These findings are consistent with those of (Kvrgic et al., 2012) who reported that 65% of their studied patients with schizophrenia exhibited high levels of avoidant attachment compared to the anxious attachment. These results were also consistent with several studies of (Korver-Nieberg, Berry, Meijer & de Haan, 2014; Gumley, Taylo, Schwannauer & MacBeth, 2014) who reported that the largest proportion of their samples of patients with schizophrenia were classified as having a dismissing or avoidant attachment style.

Virtually, this result could be attributed to a disorganization of the early attachment behaviors, mainly associated with unresolved traumas and/or loss of the attachment figure or caregiver. It has been documented that schizophrenia is linked with a wide range of early adverse experiences such as parental separation, neglect, exposure to sexual or physical abuse, and/or even being an unwanted child. These early unfavorable experiences can lead to interruptions in the development of early secure attachment relationships that subsequently result in maldevelopment of the internal working model of the self and others (Castilho et al., 2017; Gutiérrez, 2018). Such experiences could contribute to distortion in the perception of the world and reality, increased

sensitivity to social interactions, hyperactivity of paranoid and disorganized thinking, and affective dysregulation. In this respect, (Bifulco et al., 2006) claimed that insecure adult attachment styles are partially mediated by the relationship between adverse childhood experiences and psychopathology in adulthood.

Undeniably, individuals with insecure attachment during stressful times they become more insecure, mistrust others and incapable to control and regulate their responses. They either intensify their levels of distress to get their attachment needs met resulting in anxious attachment style or deactivates their attachment system and avoid all close relationships resulting in avoidant attachment style. Such mechanisms could cause paranoid delusions, loss of ego boundaries and/or auditory hallucinations. The insecure attachment styles may also act as a catalyst with other biological, environmental, and psychosocial risk factors in a more direct or indirect way to produce a maladjustment which could result in positive symptoms of schizophrenia (Kvrgic et al., 2012).

In the same vein, retrospective studies have documented that the patient with schizophrenia who exhibit avoidant attachment style, at an early age will always feel rejected and less supported from his significant caregivers. Such feelings could create a disturbed self-image, defensive minimization of affect, devaluation of other people, interpersonal hostility, avoidance of close relationships and social withdrawal as a way to manage early traumatic experiences. In other words, the perception of his actual reality is distorted and invalid (Dozier, Caron & Bernard, 2014; Ponizovsky, Nechamkin & Rosca, 2007; MaBeth, Gumley, Schwannauer & Fisher, 2011).

On the other hand, patients with anxious attachment style often have increased tendency to attribute negative events and situations to themselves with a reduction in sense of autonomy resulting in increased dependence on others. These unstable and insecure attachment experience with significant others increase the vulnerability to produce psychotic symptoms that are mainly found among patients with

schizophrenia (Dozier & Lee, 1995; Ponizovsky et al., 2007; MaBeth et al., 2011).

On the contrary, another study reported that more than half of people (58%) with psychosis in their study were found to have a fearful attachment style rather than avoidant which accounted for 25% of the sample and anxious attachment style was only found to occur in 17% of individuals with psychosis (Gajwani et al., 2013). It is worth mentioning here that this study used a different tool (adult attachment tool), which might explain the difference between their results and ours.

As for the patient's marital status, the present study reflects that insecure attachment style was significantly more prevalent among the divorced and separated patients. It seems that these findings are caused by the lack of trust toward others which explains the disruption in their family life and their tendency/preference to live alone. Another explanation to the present findings is that divorced and separated patients are thought to have low self-esteem, fear from interaction, negative self-evaluation, negative image of self, interpersonal hostility, and social withdrawal, all can come true because of their basic disturbances in their attachment styles. This opinion was also affirmed by (Bartholomew, 1990; Mikulincer & Shaver, 2012).

The results of the present study proved to be consistent with previous studies which suggested that individuals with insecure attachment styles (avoidant or anxious) tended to be hospitalized for longer periods than those with secure attachment styles (Ponizovsky et al., 2007). In the present study, the highest mean scores of insecure attachment styles were recorded by those who were admitted to the hospital 10-15 times. This suggests that attachment styles of individuals with schizophrenia may change over time, perhaps influenced by the course of illness. Certainly, patients with schizophrenia often had detachment and disturbances in social relatedness due to their psychotic symptoms, which in turn result in maladaptive behaviors, excessive insecure attachment, or ambivalence regarding their caregivers or close persons (Gutiérrez, 2018).

The second studied variable in the present study, reality testing revealed that almost all of the studied patients with schizophrenia exhibited moderate to severe levels of reality testing impairment. This was true for both the total score as well as the sub-totals of "uncertainty of perception", "reality distortion" and "hallucinations & delusions". This result is in the same line with other studies, which reported that patients with schizophrenia had more disturbances in reality testing compared to other clinical groups (Palaniyappan et al., 2011; Hansen et al., 2012). This was reflected through the disability to distinguish internal fantasy from external reality along with three domains: uncertainty of perception, reality distortion, and hallucinations and delusions, which were all demonstrated by the studied patients. Most of the studied patients in the present study had a moderate to severe level of uncertainty of perception, a moderate level of reality distortion, and a severe level of delusions and hallucinations.

These findings could be attributed to the fact that patients with schizophrenia mainly had a deficit in their ability to appreciate the thoughts and feelings of others, to form concepts, and to judge and think abstractly in different life situations. In addition, persistent defective hierarchical temporal processing that manifests in the form of chronic memory-prediction errors or deficits in learning-dependent predictive perception. Reality distortion (delusions, thought disorder, and hallucinations) symptoms have reflected these deficits among those patients. According to (Krishnan et al., 2011), most of the patients with schizophrenia profiles document this pattern of symptoms.

The results of the present study reflected those patients who had early onset of schizophrenia (before age of 30 yrs.) had a significantly greater impairment on all three reality-testing domains, reality-distortion, the uncertainty of perception, and hallucinations and delusions compared to those who started their illness process at age 30 yrs. or more. Such a finding is consistent with (Greig et al., 2000), who agreed that the early-onset group of people with schizophrenia demonstrated significantly higher mean scores on all three reality-testing subscales (reality distortion,

uncertainty of perception and delusions and hallucinations) than did people in the late-onset group. From the researcher's point of view, the key explanation of this finding is that occurrence of schizophrenia with disruption and splitting of ego at an early age during personality and identity development leads to a breakdown in its unity, together with concurrent attempts to recover the lost cohesion. These attempts probably end with these obvious manifestations, namely alterations in the perception and flow of thought, emotional ambivalence, delusions, and hallucinations.

Likewise, the present study confirmed that getting older was associated with more disturbances in reality testing. This finding is consistent with that of (Hansen et al., 2012). These findings may be attributed to the patient's navigation ability (finding and maintaining a route in a familiar or unfamiliar environment). Navigation is one of the fundamental cognitive functions that decline the most with increasing age. Empirical studies have found that navigation is vulnerable/sensitive to aging and hence can disturb an individual's ability to perceive reality accurately. Compared with young adults, older adults tend to commit more errors and take longer in solving navigation tasks (Zhong & Moffat, 2016; Zhang et al., 2020).

Lastly, single patients in this study had shown a higher level of reality testing impairment compared to married and divorced patients. This finding is consistent with that of (Moss and Willoughby, 2018). From the researcher's point of view, single patients most probably are having low social and emotional support which is experienced by married individuals. This emotional support can be an important catalyst for greater life satisfaction and better coping mechanisms against the hardships of life and leading to improved psychological well-being. Vice versa, its absence may heighten the risk for stress these patients and consequently raise the level of their reality testing impairment.

The last aim of this study was to investigate the relationship between attachment style and reality testing impairment among patients with schizophrenia. In this respect, the

present study gave evidence on the presence of a collective significant correlation between the total of reality testing impairment as well as between almost all sub-styles of each. The most obvious and consistent variable in this equation was the avoidant attachment.

The abovementioned findings could be explained in the light of other studies that reported that patients with avoidant attachment had a severe tendency to distance themselves from others who do not respond to their attachment need, distrust of others, and increased social isolation. These could predispose them to have more paranoid thinking, reality distortion, uncertainty of perception, and hallucinations. It was claimed that the occurrence of psychotic symptoms such as paranoid thoughts and hallucinations were preceded by elevated insecurity attachment styles, particularly the avoidant style (Dhossche et al., 2002; Brookwell et al., 2013). Anxious attachment came next in effect to avoidant attachment, as it was only correlated with hallucinations and delusions. The present study result is consistent with that of (Ponizovsky et al., 2007) who found that anxious attachment is linked with positive but not negative symptoms. However, in contrast with the present study, (MaBeth et al., 2011) found in their study that insecure/dismissing attachment was the most prevalent in the studied sample but no relationship was observed between attachment style and psychotic symptoms.

In that respect, various hypotheses have been proposed concerning the relationship between attachment and psychosis. The risk process that might be involved in the association between dismissing/avoidant attachment and psychosis is externalizing affect regulations strategies which are involved in the development of positive symptoms. An avoidant attachment could be connected to positive psychotic symptoms through externalizing behavioral and cognitive strategies (Lysaker & Dimaggio, 2014).

Dismissing/avoidant attachment is characterized by a turning away from attachment towards exploration in situations of distress. Subsequent to this externalizing affect regulation strategy, infant avoidant attachment

expects externalizing behavior, which in turn is associated with hallucinations in a youth. Externalizing cognitions are further found to reinforce hallucinatory experiences (Dhossche et al., 2002; Brookwell et al., 2013). Likewise, associations between avoidant attachment and positive symptoms support cognitive models of psychosis which suggest that negative beliefs and social withdrawal play a role in maintaining positive symptoms, particularly paranoia (Garety et al., 2001).

The studied patients with schizophrenia originally had an avoidant attachment style that was significantly related to reality testing impairment. Consistent with this finding of Dozier, Caron & Bernard, (2014) who suggested that patients with dismissing/avoidant attachment style experience more delusion, hallucination and has been suspiciousness and defined as "more psychotic". In the same line, a previous study by Berry, Barrowclough & Wearden, (2008) proposed that avoidant attachment style is a meaningful variable in people with schizophrenia and may be an important predictor of psychotic symptoms as positive, negative symptoms and paranoid cognition and behavior. Likewise, Bentall & Fernyhough, (2008) also linked attachment style with psychotic symptoms both positive and negative symptoms as well as its severity. Hence, comes the importance of this study.

Conclusion

Based on the results of the present study, it can be concluded that almost all patients with schizophrenia exhibit insecure attachment styles, with avoidant attachment style being the most prevalent, usually in a severe level in the majority of cases. On the other hand, the great majority of these same patients present with reality-testing impairment reflected in its three domains: reality distortion, the uncertainty of perception, and hallucinations & delusions. Evidence of correlation between attachment styles and reality-testing impairment, (both of the total and sub-total domains) in these patients usually and frequently there.

Recommendations:

In the light of the aforementioned the following recommendations can be made:

I- Recommendations geared toward psychiatric health care providers:

- Nursing staff and health caregivers need to understand and be aware of the psychodynamic of patients with insecure attachment styles to establish the appropriate therapeutic relationship.
- Take into consideration building up a secure, structured, and consistent environment for patients with schizophrenia to modify their insecure attachment styles and hope to become more reality oriented.
- As primary prevention, nurses and health caregivers working in Maternal and Child Health centers should work on mothers (and mothers-to-be) on the importance of developing secure ties and bonds with their children to develop a secure attachment style and positive view of themselves and others.
- Assuming a more positive role through nursing staff and health care providers in implementing different types of Cognitive Behavior Therapy such as Mentalization, Cognitive Interpersonal Therapy, and Cognitive Analytic Therapy for those with insecure attachment styles to modify the severity of their reality-testing impairment.

II- Recommendations for future research:

- Future empirical studies to investigate specific techniques for managing insecure attachment styles, in particular, avoidant ones within the therapeutic setting.
- Prospective longitudinal studies are important to gain insight into whether attachment style is predictive of reality-testing impairment in schizophrenia or whether attachment style changes as a result of schizophrenia.

References

- Ainsworth M, Blehar M, Waters E and Wall S. *Patterns of Attachment: A Psychological Study of the Strange Situation*. Hillsdale, NJ: Erlbaum, 1978.
- Arango C and Carpenter WT. The schizophrenia construct: Symptomatic presentation. in D. R. Weinberger & P. J. Harrison. *Schizophrenia* (3rd ed). USA: Wiley-Blackwell, 2011; p.p. 9-23.
- Bartholomew K. Avoidance of intimacy: An attachment perspective. *J. Soc. Pers. Relat.* 1990;7(2), 147-178.
- Bell MD, Billington RJ and Becker BR. Scale for the assessment of reality testing: reliability, validity, and factorial invariance. *J. Consult. Clin. Psychol.* 1985;53(4), 506-511.
- Bell MD, Conway Greig T, Bryson G and Kaplan E. Patterns of object relations and reality testing deficits in schizophrenia: clusters and their symptom and personality correlates. *J. Clin. Psychol.* 2001;57(12), 1353-1367.
- Bentall RP and Fernyhough C. Social predictors of psychotic experiences: specificity and psychological mechanisms. *Schizophr. Bull.* 2008;34(6), 1012-1020.
- Berry K, Barrowclough C and Wearden A. Attachment theory: a framework for understanding symptoms and interpersonal relationships in psychosis. *Behav. Res. Ther.* 2008;46(12), 1275-1282.
- Berry K, Wearden A, Barrowclough C and Liversidge T. Attachment styles, interpersonal relationships and psychotic phenomena in a non-clinical student sample. *Pers. Individ. Differ.* 2006;41(4), 707-718.
- Bifulco A, Kwon J, Jacobs C, Moran PM, Bunn A and Beer N. Adult attachment style as mediator between childhood neglect/abuse and adult depression and anxiety. *Soc. Psychiatry. Psychiatr. Epidemiol.* 2006;41(10), 796-805.
- Brenner C. *An elementary textbook of psychoanalysis*. New York: Anchor Books, 1974.
- Brookwell ML, Bentall RP and Varese F. Externalizing biases and hallucinations in source-monitoring, self-monitoring and signal detection studies: a meta-analytic review. *Psychol. Med.* 2013;43(12), 2465-2475.

- Capuano A. (2020). Finding Attachment Style Character Strengths Through Positive Art Therapy (Master Thesis). Notre Dame de Namur University.
- Castilho P, Martins MJ, Pinto AM, Viegas R, Carvalho S and Madeira N. Understanding the effect of attachment styles in paranoid ideation: The mediator role of experiential avoidance. *J. Contextual. Behav. Sci.* 2017;6(1), 42-46.
- Cheng SC, Walsh E and Schepp KG. Vulnerability, Stress, and Support in the Disease Trajectory from Prodrome to Diagnosed Schizophrenia: Diathesis-Stress-Support Model. *Arch. Psych. Nurs.* 2016;30(6), 810-817.
- Corcoran M and McNulty M. Examining the role of attachment in the relationship between childhood adversity, psychological distress and subjective well-being. *Child. Abuse. Negl.* 2018;76, 297-309.
- Crittenden PM. Quality of attachment in the preschool years. *Dev. Psychopathol.* 1992;4(2), 209-241.
- Dhossche D, Ferdinand R, Van der Ende J, Hofstra MB and Verhulst F. Diagnostic outcome of self-reported hallucinations in a community sample of adolescents. *Psychol. Med.* 2002;32(4), 619-627.
- Dozier M, Caron EB and Bernard K. Attachment and Biobehavioral Catch-Up: An Intervention for Parents at Risk of Maltreating Their Infants and Toddlers. in S. G. Timmer & A. Urquiza. Evidence-Based Approaches for the Treatment of Maltreated Children (New York: Springer Science & Business Media, 2014; p.p. 43-59.
- Gajwani R, Patterson P and Birchwood M. Attachment: developmental pathways to affective dysregulation in young people at ultra-high risk of developing psychosis. *Br. J. Clin. Psychol.* 2013;52(4), 424-437.
- Garety PA, Kuipers E, Fowler D, Freeman D and Bebbington PE. A cognitive model of the positive symptoms of psychosis. *Psychol. Med.* 2001;31(2), 189-195.
- Glazebrook K, Townsend E and Sayal K. Do Coping Strategies Mediate the Relationship Between Parental Attachment and Self-Harm in Young People? *Arch. Suicide. Res.* 2016;20(2), 205-218.
- Greig TC, Bell MD, Kaplan E and Bryson G. Object relations and reality testing in early- and late-onset schizophrenia. *J. Clin. Psychol.* 2000;56(4), 505-517.
- Gumley AI, Taylor HE, Schwannauer M and MacBeth A. A systematic review of attachment and psychosis: measurement, construct validity and outcomes. *Acta. Psychiatr. Scand.* 2014;129(4), 257-274.
- Gutiérrez SAG. (2018). *A Review To The Association Between Schizophrenia And Attachment* (Ph.D Thesis). Facultad de Ciencias Humanas & Sociales: Universidad de Antioquia.
- Hansen CF, Torgalsbøen AK, Røssberg JI, Andreassen OA, Bell MD and Melle I. Object relations and reality testing in schizophrenia, bipolar disorders, and healthy controls: differences in profiles and clinical correlates. *Compr. Psychiatry.* 2012;53(8), 1200-1207.
- Korver-Nieberg N, Berry K, Meijer CJ and de Haan L. Adult attachment and psychotic phenomenology in clinical and non-clinical samples: a systematic review. *Psychol. Psychother.* 2014;87(2), 127-154.
- Korver-Nieberg N, Fett AK, Meijer CJ, Koeter MW, Shergill SS, de Haan L, et al. Theory of mind, insecure attachment and paranoia in adolescents with early psychosis and healthy controls. *Aust. N. Z. J. Psychiatry.* 2013;47(8), 737-745.
- Krishnan RR, Kraus MS and Keefe RS. Comprehensive model of how reality distortion and symptoms occur in schizophrenia: could impairment in learning-dependent predictive perception account for the manifestations of schizophrenia? *Psychiatry. Clin. Neurosci.* 2011;65(4), 305-317.
- Kuipers E, Yesufu-Udechuku A, Taylor C and Kendall T. Management of psychosis and schizophrenia in adults: summary of updated NICE guidance. *Brit. Med. J.* 2014;348, g1173.
- Kvrgic S, Beck EM, Cavelti M, Kossowsky J, Stieglitz RD and Vauth R. Focusing on the adult attachment style in schizophrenia in community mental health centres: validation of the Psychosis Attachment Measure (PAM) in a German-speaking sample. *Int. J. Soc. Psychiatry.* 2012;58(4), 362-373.

- Lester AW, Moffat SD, Wiener JM, Barnes CA and Wolbers T. The Aging Navigational System. *Neuron*. 2017;95(5), 1019-1035.
- Levy KN, Ellison WD, Scott LN and Bernecker SL. Attachment style. *J. Clin. Psychol*. 2011;67(2), 193-203.
- Lysaker PH and Dimaggio G. Metacognitive capacities for reflection in schizophrenia: implications for developing treatments. *Schizophr. Bull*. 2014;40(3), 487-491.
- MaBeth A, Gumley A, Schwannauer M and Fisher R. Attachment states of mind, mentalization, and their correlates in a first-episode psychosis sample. *Psychol. Psychother*. 2011;84(1), 42-57.
- Mikulincer M and Shaver PR. An attachment perspective on psychopathology. *World. J. Psychiatry*. 2012;11(1), 11-15.
- Moss E and Willoughby BJ. Associations between beliefs about marriage and life satisfaction: The moderating role of relationship status and gender. *J. Fam. Stud*. 2018;24(3), 274-290.
- Olbert CM, Penn DL, Reise SP, Horan WP, Kern RS, Lee J, et al. Assessment of attachment in psychosis: A psychometric cause for concern. *Psychiatry. Res*. 2016;246, 77-83.
- Oppenheim L. *Imagination from fantasy to delusion*. New York: Routledge, 2013.
- Palaniyappan L, Mallikarjun P, Joseph V, White TP and Liddle PF. Reality distortion is related to the structure of the salience network in schizophrenia. *Psychol. Med*. 2011;41(8), 1701-1708.
- Petriglieri JL and Obodaru O. (2016). Secure base relationships as drivers of professional identity coconstruction in dual career couples. Retrieved from <https://www.clsbe.lisboa.ucp.pt/pt-pt/system/files/assets/files/2016-paper-jennifer-petriglieri.pdf>. [Accessed in: Mar, 2021]
- Platts H, Tyson M and Mason O. Adult attachment style and core beliefs: Are they linked? *Clin. Psychol. Psychother*. 2002;9(5), 332-348.
- Ponizovsky AM, Nechamkin Y and Rosca P. Attachment patterns are associated with symptomatology and course of schizophrenia in male inpatients. *Am. J. Orthopsychiatry*. 2007;77(2), 324-331.
- Quijada Y, Kwapil TR, Tizón J, Sheinbaum T and Barrantes-Vidal N. Impact of attachment style on the 1-year outcome of persons with an at-risk mental state for psychosis. *Psychiatry. Res*. 2015;228(3), 849-856.
- Ringer JM, Buchanan EE, Olessek K and Lysaker PH. Anxious and avoidant attachment styles and indicators of recovery in schizophrenia: associations with self-esteem and hope. *Psychol. Psychother*. 2014;87(2), 209-221.
- Saha S, Chant D and McGrath J. A systematic review of mortality in schizophrenia: is the differential mortality gap worsening over time? *Archives of General Psychiatry* 2007;64(10), 1123-1131.
- Shaver PR, Collins N and Clark CL. Attachment styles and internal working models of self and relationship partners. in G. J. O. Fletcher & J. Fitness. *Knowledge structures in close relationships: A social psychological approach* (Mahwah: Lawrence Erlbaum Associates, Inc, 1996; p.p. 25-61.
- Sherman LJ, Rice K and Cassidy J. Infant capacities related to building internal working models of attachment figures: A theoretical and empirical review. *Dev. Rev*. 2015;37, 109-141.
- Zhang J, Wang L, Hou H, Yue C, Wang L and Li H. (2020). Age-related impairment of navigation and strategy in virtual reality star maze. Retrieved from <https://assets.researchsquare.com/files/rs-45856/v3/4c42e81f-92f4-4424-988a-fe0ac2541568.pdf?c=1611074285>. [Accessed in: May, 2021]
- Zhong JY and Moffat SD. Age-Related Differences in Associative Learning of Landmarks and Heading Directions in a Virtual Navigation Task. *Front. Aging. Neurosci*. 2016;8, 122.