Schizophrenia symptom dimensions in correlation to patients' demographic and clinical characteristics

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Background
Schizophrenia symptom dimensions could vary with clinical and demographic variables.
Materials and methods
A total of 100 patients with schizophrenia were diagnosed based on the Diagnostic and statistical manual criteria of the American Psychiatric association. Positive and negative symptom scale was used to assess schizophrenia symptoms. The search for possible correlations between dimensions and demographic and clinical variables was done by Pearson correlation coefficient.
Results and conclusion
Symptom dimensions showed a correlation with age, onset, duration, hospitalization, compliance to medication, duration without treatment, and family history of schizophrenia.

Keywords:
demographic characteristics, schizophrenia, symptom dimensions

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Introduction

A problem with the categorical approach is the need to define clear-cut thresholds between presence and absence of disorders. Studies have shown that conditions below cut-off thresholds of disorders have significant clinical relevance in terms of functional impairment, mortality, treatment, and prognosis (Angst *et al.*, 2000). Thus, experts have suggested that disorders are best described with dimensional symptom measures (Andrews *et al.*, 2007; Shear *et al.*, 2007). In 2008, the National Institute of Mental Health included in its new Strategic Plan developing new ways of classifying mental disorders based on dimensions of observable behavior and neurobiological measures. The implementation of this aim was the Research Domain Criteria project, which departs markedly from the diagnostic and statistical manual (DSM) and international classification of diseases (ICD) processes. Research Domain Criteria project includes two-dimensional matrix. Constructs/domains appear in rows. Domains include arousal, cognitive, valence, and social systems. Columns of the matrix represent various classes of neurobiological measure/paradigms. Paradigms include genes, molecules, cells, circuits, physiology, behavior, and self-reports (Cuthbert, 2014).

Neurobiological basis of symptom dimension in schizophrenia is related basically to dopamine, which plays a key role in hypothesis about certain aspects of the five dimensions (Stahl, 2003).

Neurobiological basis of positive symptoms and hostility is serotonergic release of dopaminergic mesolimbic pathway (Kapur and Remington, 2001), whereas negative, depressive, and cognitive symptoms basis is serotonergic inhibition of dopaminergic dorsolateral prefrontal pathway (Buchanan *et al.*, 1999).

Neurobiological implications of age effect on symptom domains in schizophrenia: excess excite-toxic glutamate systems [N methyl D aspartate (NMDA) receptors] open calcium channels activating intracellular enzymes that form free radicals leading to progressive worsening of symptoms (Sharma, 2000).

Neurobiological implications of sex effect on symptom domains in schizophrenia: estrogen reduces dopamine receptor levels (Chavez *et al.*, 2010).

Neurobiological implications of treatment effect on symptom domains in schizophrenia: first-generation antipsychotics (dopamine antagonists) control positive symptoms, but worsen negative, depressive, and cognitive symptoms, besides they cause extrapyramidal adverse effects and hyper-prolactinemia. Second-

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generation antipsychotics (dopamine and serotonin antagonists) control positive, negative, depressive, and cognitive symptoms, besides they hardly cause extrapyramidal adverse effects and hyperprolactinemia (Kosgi *et al.*, 2015).

These implications suggest that schizophrenia symptom dimensions could vary with clinical and demographic variables, and this needs further assessment.

Materials and methods

Study design

An observational study was conducted.

Patients

A convenient sample of patients was involved in the study, which consisted of 100 inpatients and outpatients recruited from Mansoura University Psychiatry Department.

Tools

(1) Clinical assessments: For all patients, thorough history and psychiatric examination using semistructured interview were done. Clinical diagnosis of schizophrenia was done and confirmed by another physician in an independent evaluation. Then a consensus was reached based on diagnostic and statistical manual criteria.
(2) Psychopathology (symptomatology) assessment: Positive and Negative Syndrome Scale (PANSS) is a 30-item rating completed by the researcher. PANSS is specially developed to assess individual with schizophrenia and is widely used in research setting. This scale was designed to assess three main domains: positive (seven items), negative (seven items), and general psychopathological (16 items) using operationally defined seven-point scale rating, which is generally based upon information related to past week (1=none and 7=extreme).

Statistical analysis

Correlations between dimensions and demographic and clinical variables were done by Pearson correlation coefficient.

Results

In this study, participants' mean age is 33.72 years old, 60% are males, 54% are educated and 49% are single (Table 1).

Participants' mean age of onset of schizophrenia is 34.51 years old, mean duration of schizophrenia is around 11 years, mean duration of hospitalization is around 10 months, mean onset to treatment is around 4 years, 73% have gradual onset, 55% have no family history of schizophrenia, 58% are compliant and 52% have full remission (Table 2).

The age of onset of schizophrenia has been negatively correlated to positive symptoms. The marital state has been positively correlated to depressive symptoms (Table 3).

The duration of schizophrenia has been negatively correlated to positive symptoms. The acute onset of schizophrenia has been positively correlated to positive symptoms. Treatment onset has been negatively correlated to depressive symptoms. The compliance has been positively correlated to negative, depressive and cognitive symptoms. The family history of

Table 1 Demographic characteristics of the sample

Variables	*N*=100
Age (mean±SD)	33.72±7.39
Sex	
Male	60
Female	40
Education	
Yes	54
No	46
Marital status	
Single	49
Married	27
Divorced	19
Widow	7

Table 2 Clinical characteristics of the sample

Variables	*N*=100
Age of onset (mean±SD)	34.51±4.33
Type of onset	
Acute	17
Gradual	73
Duration of schizophrenia (mean±SD) (years)	11.24±11.77
Duration of hospitalization (mean±SD) (months)	10.83±26.48
Onset to ttt (mean±SD)	4.63±3.30
Compliance	
Yes	58
On-off	30
No	12
TTT response	
Yes	58
On-off	30
No	12
Family history	
Yes	45
No	55

TTT, treatment.

Table 3 Correlation of symptom dimensions to demographic variables

	Factor 1 (negative)	Factor 2 (positive)	Factor 3 (excitation)	Factor 4 (depressive)	Factor 5 (cognitive)
Age					
r	–0.206*	0.151*	0.081	0.056	0.005
P	0.040	0.034	0.215	0.580	0.957
Sex					
r	–0.038	–0.124	–0.109	0.154	–0.027
P	0.710	0.219	0.282	0.127	0.792
Marital status					
r	181	0.156	0.046	0.144*	0.066
P	0.34	0.4	0.29	0.005	0.68
Education					
r	–0.237	–0.289	–0.372	–0.362	–0.358
P	0.018	0.003	<0.001	<0.001	<0.001

Table 4 Correlations of symptom dimensions to clinical variables

	Factor 1 (negative)	Factor 2 (positive)	Factor 3 (excitation)	Factor 4 (depressive)	Factor 5 (cognitive)
Age at onset of disorder					
r	–0.017	–0.258*	–0.118	–0.160	–0.109
P	0.865	0.010	0.242	0.112	0.282
Duration of disorder					
r	0.135	–0.234*	–0.140	0.073	0.144
P	0.182	0.019	0.165	0.468	0.154
Duration of hospitalization					
r	0.212*	0.217*	0.268*	0.261*	0.091
P	0.045	0.031	0.007	0.009	0.369
Type of disorder onset					
r	0.88	–0.202*	–0.55	0.56	0.131
P	0.382	0.044	0.585	0.522	0.194
Onset of treatment					
r	0.086	–0.161	–0.164	–0.224*	–0.040
P	0.402	0.113	0.107	0.026	0.698
Compliance to medications					
r	0.420*	0.008	0.034	0.201*	0.343*
P	0.000	0.934	0.816	0.045	0.000
Response to treatment					
r	0.563*	0.247*	0.341*	0.474*	0.503*
P	0.000	0.013	0.001	0.000	0.000
Family history of schizophrenia					
r	0.188	0.079*	0.039	0.272*	0.143
P	0.061	0.043	0.700	0.016	0.155

r, correlation coefficient.**Correspondence to Correlation is significant at the 0.05 level (two-tailed). **Correlation is significant at the 0.01 level (two-tailed).

schizophrenia has been positively correlated to positive and depressive symptoms (Table 4).

Discussion

In this study, age of onset of schizophrenia was negatively correlated with positive symptoms. This is in contrast to the study of Kao and Liu (2010), where age of onset was significantly related to the cognitive component of the (PANSS) [odds ratio: 0.58; 95% confidence interval (CI): 0.872–0.985; $P<0.001$]. Moreover, through a systematic review and a meta-analysis as a random-effect analysis with correlation coefficients between age at onset and the outcomes, there was a statistically significant ($P<0.05$) correlation between younger age at onset and more hospitalizations (number of studies, $n=9$; correlation, r=0.17; 95% CI: 0.09–0.25), more negative symptoms ($n=7$; r=0.14; 95% CI: 0.01–0.27), and more relapses ($n=3$; r=0.11; 95% CI: 0.02–0.20). This was the first systematic review of the effects of age at onset on the long-term outcomes of schizophrenia. The results show that age at onset has a small but significant effect on

some of the outcomes of schizophrenia (Immonen *et al.*, 2017).In this study, duration of schizophrenia was negatively correlated with positive symptoms. This agrees with the study of Vrbova *et al.* (2018), which states that symptoms of schizophrenia are positively correlated with duration of the disorder. In the study of Kao and Liu (2010), there are significant differences between several demographic and clinical variables, including the negative symptom component of the PANSS ($P<0.001$) and cognitive component of the PANSS ($P<0.001$), between patients with early onset and those with adult onset of illness.

In this study, acute onset of schizophrenia has been positively correlated with positive symptoms. Treatment onset has been negatively correlated with depressive symptoms. In a cross-sectional study on patients with schizophrenia by Odinka *et al*. (2014), respondents who had predominant positive symptoms had a median duration of untreated psychosis DUP of 8 or 24 weeks. However, those who had predominant negative symptoms had a median DUP of 144 or 310 weeks. The predominance of negative symptoms could militate against early presentation among people with schizophrenia, probably because negative symptoms are poorly recognized as indicating mental illness, as they could be interpreted as deviant behavior or spiritual problems that would require spiritual solutions.

In this study, compliance has been positively correlated to negative, depressive, and cognitive symptoms. This is in contrast to Bajaj *et al.* (2009) who showed compliance is negatively correlated to psychopathology scores on PANSS.

In this study, family history of schizophrenia has been positively correlated to positive and depressive symptoms. Liang *et al.* (2018) showed evidence concerning the link between family history and cognitive endophenotype in schizophrenia.

Overall, the findings of this study suggest that symptom dimensions of patients with schizophrenia are associated with patients' sociodemographic background and clinical history in a differential manner. This may support the view that the dimensional approach to phenomenology in schizophrenia is valuable from both a scientific and a clinical point of view.

The relatively small size of the sample in this study, observational design, and the different phases of illness in the studied patients may have contributed to some limitations of this study.

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Conflicts of interest
There are no conflicts of interest.

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