Clinical profile and functioning in late-onset versus early-onset schizophrenia: a comparative study

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Background
Psychotic symptoms arising *de novo* among older adults are not uncommon. Their distinctive features and phenomenology are of increasing clinical interest. Their comparison with early-onset psychosis can provide better insight into this complex phenomenon.

Aim
The aim of this study was to compare the clinical picture and functioning of 50 patients presenting with late-onset schizophrenia (LOS) (>50 years) with a similar number of patients with early onset (<50 years).

Patients and methods
The recruited patients were interviewed using the Structured Clinical Interview for DSM Axis-I Disorders (SCID-I). Those fulfilling the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. diagnostic criteria for schizophrenia and other psychotic disorders underwent further clinical evaluation of the psychopathology using the Positive and Negative Syndrome Scale. The functioning was estimated using activities of daily living and instrumental activities of daily living.

Results
Patients with LOS were mainly women, unmarried or divorced, living alone, had less familial psychiatric history, higher education and better premorbid functioning compared with their earlier-onset counterparts. Their psychotic symptoms occurred mainly in conjunction with a number of chronic medical illnesses and sensory deficits, with less impairment in daily living function in contrast to the earlier-onset group. Clinically, the delayed development of psychosis was associated with a relative lack of negative symptoms, affective blunting, formal thought disorder and the absence of conceptual disorganization. Nonetheless, it was associated with prominent systematized delusion and multimodal hallucinations. Our study showed that paranoid schizophrenia was by far the most frequent diagnostic type of schizophrenia encountered in the LOS group, whereas the disorganized and undifferentiated schizophrenia subtypes were the most common diagnoses in the early-onset schizophrenia group.

Conclusion
Our data support the finding of differences in the phenomenology, psychosocial variables and functioning between patients with LOS and early-onset schizophrenia. Hence, a critical re-evaluation of the current diagnostic systems in the light of this awareness is very important. Schizophrenia symptoms arising *de novo* at an older age is better designated in the classification as a subtype of schizophrenia. This remains a nosological caveat that requires further evaluations.

Keywords:
late-onset psychosis, Positive and Negative Syndrome Scale, phenomenology, schizophrenia

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Introduction

In Egypt, 6% of the population are individuals older than 60 years of age and is expected to reach 11.5% by the year 2025 [1]. Worldwide, the number of individuals 65 years of age and older has increased from 17 million in 1900 to 342 million in 1992. This is expected to increase to 2.5 billion, representing 20% of the total global population by 2050 [2]. Life expectancy has increased considerably in western countries and the USA, and it is expected to increase further [3]. Psychotic symptoms arising *de novo* among older adults are not uncommon and are of increasing clinical interest [4,5]. The proportion of patients with

schizophrenia who developed their illness after the age of 50 years was estimated to be 23.5% [6].

There has been century-long controversy in terms of the diagnosis and aetiology of psychosis, which develops later in life [7,8]. The conceptualization of these syndromes led to a number of research questions on the aetiology, phenomenology and the hypothesized neural mechanisms implicated in the pathophysiology of these late-onset psychotic disorders [9,10].

In the arena of brain research, the question of whether early-onset and late-onset psychosis may share similar neurobiological or neurodevelopmental models of schizophrenia still remains unanswered [11]. Epidemiologic studies suggest that there are specific risk factors distinctive of late-life psychoses; these included female sex, and visual and auditory sensory impairments [12]. Physical anomalies are more prevalent among individuals with psychosis [13] and psychoses in late life, in particular, are associated with many neurologic abnormalities, for example, white matter diseases or vascular lesions [14,7,15,16].

The nosological status of late-onset psychotic states has been controversial. It was not incorporated as a separate category into either the International Classification of Diseases (ICD) or the *Diagnostic and Statistical Manual* (DSM). Nevertheless, it is worth mentioning that the term 'paraphrenia (late)' was present under 'paranoid states' in earlier editions of the ICD; it was removed and then readded in the final version of ICD-10, but as a part of 'delusional disorder' [17].

On the basis of various findings that schizophrenia can arise *de novo* at a later age differs than that of early onset in many aspects [18]. Recent investigations in this field recommended designating late-onset schizophrenia (LOS) as a formal subtype of schizophrenia and suggested further research to understand the possible factors responsible for the delayed onset.

Rationale of the study

The number of individuals with a diagnosis of schizophrenia that emerges *de novo* at a late onset is expected to double over the next 20 years [19]. Conversely, research in this area is still scarce and lagging behind research on other psychoses. More collaborative research efforts are needed to focus on this area.

Aim of the work

We aimed to assess the similarities and differences in the clinical profile and daily functioning between patients with early-onset schizophrenia (EOS) versus LOS. We aimed to determine whether LOS is a separate condition from the typical EOS or rather an expression of a unitary condition affected by age, and should thus be considered as a formal subtype of schizophrenia.

Patients and methods

Design and methods

This is a cross-sectional, comparative study and the sample was selective. Patients were recruited over 1 year from Ain Shams University Hospitals (Department of Geriatric Medicine and Institute of Psychiatry). These hospitals provide services for the Eastern region of Greater Cairo and the nearby Governorates.

Operational definition

LOS was operationally defined according to the consensus statement of the International Late-Onset Schizophrenia Group as cases with an onset of prodromal symptoms after the age of 50 years and refers to schizophrenia or a related disorder: schizoaffective, schizophreniform or delusional disorder [12].

Selection of patients

Group A included 50 patients with LOS according to the operational definition and fulfilling the DSM-IV diagnostic criteria of schizophrenia and other psychotic disorders. Patients with a past history of DSM-IV lifetime schizophrenia, other psychotic disorders secondary to medical disease, substance abuse, dementia or delirium were excluded.

Group B included 50 patients who developed their psychotic symptoms before the age of 50 years (EOS) and fulfilling the DSM-IV diagnostic criteria of schizophrenia, other psychotic disorders and who were admitted or attended the outpatient clinics of the Institute of Psychiatry. Their symptoms should not be secondary to substance abuse or medical disease. All patients from both groups were under psychotropic medication.

Ethical considerations

After receiving the approval of Ain Shams University Ethical committee, an informed consent was obtained from the patients or their legal substitutes after a detailed explanation of the topic and aim of the study was provided. We confirmed that they were free to participate in or leave the study, without implication on their clinical care.

Tools applied in this study

(1) Diagnostic tool
   (a) The Structured Clinical Interview for DSM Axis-I Disorders (SCID-I) [20], which is a semistructured, clinician-administered, interview that was developed to provide broad coverage of psychiatric diagnosis according to DSM-IV. Most diagnoses are made on a lifetime (ever present) and current (meets the diagnostic criteria in the past month) basis. The Arabic translation of the SCID-I was used in this study [21].

(2) Clinical assessment tool
   (a) Positive and Negative Syndrome Scale (PANSS) [22]: this is designed to measure the severity of psychopathology in adult patients

with schizophrenia, schizoaffective disorder and other psychotic disorders.

(3) Sociodemographic assessment tool
   (a) Sociodemographic data were assessed using the social classification scale in the Egyptian community [23].

(4) Functional assessment tools [24]
   (a) Activities of daily living: this assesses certain basic abilities that an individual must have to remain at home independently. These abilities allow an individual to perform basic self-care tasks. Accordingly, patients were classified as follows: needs no support (10), needs partial support (6–9) or needs full support (0–5). The Arabic standardized version was used [25].
   (b) Instrumental activities of daily living: this scale measures two broad categories: (a) basic self-maintenance behaviours such as feeding, dressing, bathing and mobility and (b) more complex behaviours such as managing finances, travelling and taking medications. These abilities are higher-level abilities that allow an individual to function independently at home or in the community. Accordingly, patients were classified as follows: needs no support (10), needs partial support (6–9) or needs full support (0–5). We used the Arabic standardized version [25].

(5) Reviewing medical files
   (a) Medical data were collected from the patient's hospital files and reviewed by the research team.

Statistical analysis

All the data were recorded, tabulated and transferred to the statistical package for social sciences, version 17 (SPSS Inc., IBM, Armonk, New York, USA). Descriptive statistics were described as means and SD. The student *t*-test was used for the quantitative data, whereas the qualitative data were analysed using Pearson's χ^2-test. A *P*-value less than 0.05 was used to indicate significance.

Results

Sociodemographic data

There were significantly more women in the LOS group. However, the opposite trend was found in the group of EOS patients, where male patients outnumbered female patients. Despite similarities in higher proportions of unmarried individuals, there were striking significant differences in the living status between the two groups; whereas the majority of LOS patients lived alone, those with EOS lived with their families ($P = 0.000$) (Table 1).

Education and occupation

Premorbid educational achievement was better in those with LOS compared with those in the EOS group; 42% of the patients in the LOS group had received education until the end of secondary school compared with only 16% of the patients in the EOS group. Patients with LOS were more likely to have some occupational impairment before the onset of illness. Nevertheless, this was not significant when compared with the EOS group (Table 1).

Medical history

As expected, the LOS patients had more gastrointestinal tract diseases, visual, auditory impairment and musculoskeletal diseases than the patients in the EOS group ($P = 0.000$). They also had more diabetes, hypertension and cardiovascular diseases ($P < 0.02$) (Table 2).

Functional assessment

Despite their need for more support according to their scores on activities of daily living and instrumental activities of daily living, LOS patients showed no significant difference from the EOS group in terms of scores in the daily functioning assessment (Table 3).

Clinical data

Patients with LOS had had psychotic symptoms for 12 ± 3.4 years, whereas those with EOS had had psychotic symptoms for 4.84 ± 1.44 years. Those with EOS had significant positive family history of psychotic illness as compared with the patients in the LOS group.

With respect to diagnosis (Table 4), paranoid schizophrenia was the predominant diagnosis in the LOS group (70%) compared with only 16% in EOS patients. This was followed by schizoaffective and delusional disorder (14 and 12%, respectively). However, the majority of EOS patients had either disorganized or undifferentiated schizophrenia (36 and 34%, respectively). None of the LOS patients had disorganized or residual schizophrenia compared with 34 and 8%, respectively, in EOS patients.

Clinical assessment of psychopathology

Patients with LOS had fewer negative, general psychopathology and total PANSS score than EOS patients, whereas the latter group had less positive, more prominent negative and higher total PANSS scores. Patients with LOS had complex systematized delusions of persecution, jealousy or somatic. They were more suspicious and had more multimodal hallucinations compared with their EOS counterparts, who had bizarre, persecutory, passivity referential delusions and conceptual disorganization (Table 5).

Discussion

Schizophrenia is a severe psychiatric disorder that usually develops before the age of 40 years. The relatively sudden appearance of schizophrenia in an older individual who functioned normally throughout several decades of life is a puzzling phenomenon.

There are many debates on the diagnosis and classification of late-onset psychosis [26]. Psychosis with first onset after the age of 50 years, and arising in the absence of dementia or primary affective disorder, is believed to affect 2–4% of elderly individuals [27]. Thus, there is an urgent need to discriminate and highlight the clinical

Table 1 Sociodemographic data: late-onset vs. early-onset schizophrenia

	Group A	Group B	
	Patients with LOS ($n=50$) [n (%)]	Patients with EOS ($n=50$) [n (%)]	Test
Age (years) (mean ± SD)	69.5 ± 3.39	31.42 ± 5.1	
Sex			$\chi^2=13.04$ $d.f.=1$ $P=0.000$[a]
Female	36 (72)	18 (36)	
Male	14 (28)	32 (64)	
Marital status			$\chi^2=5.1$ $d.f.=3$ $P=0.15$[c]
Married	14 (28)	15 (30)	
Never married	27 (54)	26 (52)	
Divorced	5 (10)	9 (18)	
Widow	4 (8)	0 (0)	
Living status			$\chi^2=43.5$ $d.f.=4$ $P=0.000$[a]
Spouse	5 (10)	8 (16)	
Children	3 (6)	1 (2)	
Others	1 (2)	1 (2)	
Family	10 (20)	38 (76)	
Alone	31 (62)	2 (4)	
Education			$\chi^2=18.28$ $d.f.=5$ $P=0.003$[b]
Illiterate	7 (14)	4 (8)	
Read and write	8 (16)	8 (12)	
Primary school	3 (6)	19 (38)	
Preparatory school	5 (10)	5 (10)	
Secondary school	21 (42)	8 (16)	
University	6 (12)	6 (12)	
Previous occupation			$\chi^2=2.66$ $d.f.=2$ $P=0.615$[c]
None	27 (54)	27 (46)	
Professional	8 (16)	8 (16)	
Semiprofessional	4 (8)	2 (4)	
Skilled and others	11 (22)	13 (26)	
Social class			$\chi^2=0.3$ $d.f.=3$[c] $P=0.771$[c]
High	9 (18)	3 (6)	
High middle	6 (12)	13 (26)	
Low middle	8 (16)	10 (20)	
Low	27 (54)	24 (48)	

EOS, early-onset schizophrenia; LOS, late-onset schizophrenia.
[a]Very highly significant.
[b]Significant.
[c]Nonsignificant.

characteristics and the range of functioning of this neglected group of LOS patients.

Sex preponderance

One consistent finding among many authors is the preponderance of women among LOS patients [28–33]. The results of the current study showed that the female to male ratio was 2.5 to 1 in the older group, whereas it was almost the reverse in the younger group.

Although the sex disparity seems clear, its explanation remains speculative. One theory, which has been referred to as 'the oestrogen hypothesis', postulates that oestradiol has antidopaminergic properties, which somehow protects women to a certain degree from puberty to menopause. As the oestradiol level decreases at midlife, this protective factor is lost, thus predisposing vulnerable women to a second illness-onset peak after the age of 45 years because of the decrease in oestrogen, with a relative increase in dopamine D2 receptors [34,35].

These sex differences are particularly striking, given the predominance of men among the early age-onset patients compared with the late-onset patients. Häfner *et al.* [36] suggested that oestrogen may modulate the age distribution and severity of symptoms in women, but not in men. This is certainly an area where more research is needed.

Marital status and social isolation

Social isolation has been linked to the causation of LOS [37]. The results of the current study are in agreement with those of various authors suggesting that social isolation, living alone, having no friends and having no regular visitors are more associated with LOS [12]. These risk factors appear less evident in the early-onset patients [19]. Interpreting the causal role of social

Table 2 Medical history

	Group A	Group B	
	Patients with LOS ($n=50$) [n (%)]	Patients with EOS ($n=50$) [n (%)]	Test
Diabetes			
Positive	19 (38)	9 (18)	$\chi^2=4.9$ $P=0.02$[b]
Negative	31 (62)	41 (82)	
Cardiac vascular diseases			
Positive	21 (42)	3 (6)	$\chi^2=17.76$
Negative	29 (58)	47 (94)	$P=0.00$[a]
Chest diseases			
Positive	36 (72)	32 (64)	$\chi^2=2.18$ $P=0.15$[a]
Negative	14 (28)	18 (36)	
GIT diseases			
Positive	25 (50)	3 (6)	$\chi^2=24.08$ $P=0.000$[a]
Negative	25 (50)	47 (94)	
Renal diseases			
Positive	6 (2)	2 (4)	$\chi^2=2.17$ $P=0.14$[c]
Negative	44 (88)	48 (96)	
CNS diseases			
Positive	8 (16)	3 (6)	$\chi^2=2.5$ $P=0.11$[c]
Negative	42 (84)	47 (94)	
Visual impairment			
Positive	18 (36)	2 (4)	$\chi^2=16.00$ $P=0.000$[a]
Negative	32 (64)	48 (96)	
Auditory impairment			
Positive	15 (30)	0 (0)	$\chi^2=17.64$ $P=0.000$[a]
Negative	35 (70)	50 (100)	
Musculoskeletal problems			
Positive	33 (66)	2 (4)	$\chi^2=42.24$ $P=0.000$[a]
Negative	17 (34)	48 (96)	

CNS, central nervous system; EOS, early-onset schizophrenia; GIT, gastrointestinal tract; LOS, late-onset schizophrenia.
[a]Very highly significant.
[b]Significant.
[c]Nonsignificant.

Table 3 Functional assessment: a comparison between late-onset and early-onset schizophrenia patients

	Group A	Group B	
ADL	Patients with LOS ($n=50$) [n (%)]	Patients with EOS ($n=50$) [n (%)]	Test (t-test)
ADL (mean ± SD)	10.8 ± 9.8	12.00 ± 1.3	$P>0.05$[a]
Need complete support (0–5)	2 (4)	0 (0)	
Need partial support (6–9)	4 (8)	1 (2)	
No need of support (10–12)	44 (88)	49 (98)	
IADL			
IADL (mean ± SD)	12.31 ± 2.81	15.18 ± 2.3	$P>0.05$[a]
Need complete support (0–5)	2 (4)	0 (0)	
Need partial support (6–0.9)	8 (16)	1 (2)	
No need of support (10–12)	42 (84)	49 (98)	

Scores: need complete support (0–5); need partial support (6–9); no need of support (>10).
ADL, activities of daily living; EOS, early-onset schizophrenia; IADL, instrumental activities of daily living; LOS, late-onset schizophrenia.
[a]Nonsignificant.

isolation is difficult as it can also be viewed as a consequence rather than the cause of mental illness [38]. Moreover, it is closely linked to several other sociocultural confounders including the marital status.

Egypt's collectivistic culture and extended family structure usually stress on the inclusion of elderly individuals especially women who are not married or divorced. It was striking to find that the majority of the LOS patients were living alone and isolated.

Familial risk

Hereditary predisposition to schizophrenia certainly plays an important role in the causation of schizophrenia. Although, the remits, the manifestation and the prognosis related to this predisposition are still an enigma [39],

Table 4 Clinical data: a comparison between late-onset and early-onset schizophrenia patients

	Group A	Group B	
	Patients with LOS ($n=50$) [n (%)]	Patients with EOS ($n=50$) [n (%)]	Test
Age at onset (mean ± SD)	57.24 ± 6.6	26.58 ± 5.08	
Duration of illness (mean ± SD)	12 ± 3.4	4.84 ± 1.44	
Family history of psychiatric disorders			$\chi^2=10.69$ $P=0.001$[a]
Yes	4 (8)	12 (24)	
No	46 (92)	38 (76%)	
Diagnostic subtypes			$P<0.05$
Residual schizophrenia	0 (0)	4 (8)	
Paranoid schizophrenia	35 (70)	8 (16)	
Undifferentiated schizophrenia	2 (4)	17 (34)	
Disorganized schizophrenia	0 (0)	18 (36)	
Delusional disorder	6 (12)	0 (0)	
Schizoaffective	7 (14)	3 (6)	

EOS, early-onset schizophrenia; LOS, late-onset schizophrenia.
[a]Very highly significant.

Table 5 Clinical assessment of psychopathology using Positive and Negative Syndrome Scale: a comparison between late-onset and early-onset schizophrenia patients

	Group A	Group B	*P*-value
Positive symptoms			
Delusions (1–7)	6.9 ± 1.8	4.6 ± 2.1	
Conceptual disorganization (1–7)	3.7 ± 1.2	5.2 ± 0.9	
Hallucinatory behaviour (1–7)	6.3 ± 1.3	4.9 ± 1.1	
Excitement (1–7)	3.3 ± 0.7	4.1 ± 0.8	
Grandiosity (1–7)	4.4 ± 0.9	4.4 ± 1.3	
Suspiciousness (1–7)	6.2 ± 2.1	3.7 ± 1.1	
Hostility (1–7)	4.8 ± 1.1	4.0 ± 0.9	
Total score of negative symptoms	35.6 ± 2.58	28.92 ± 2.05	$P<0.001$
Negatives symptoms			
Blunted affect (1–7)	2.9 ± 1.8	5 ± 1.1	
Emotional withdrawal (1–7)	2.4 ± 0.8	5 ± 0.7	
Poor rapport (1–7)	3.6 ± 2.3	4.2 ± 0.9	
Passive social withdrawal (1–7)	2.4 ± 1.4	4.7 ± 1.1	
Difficulty in abstract thinking (1–7)	2.4 ± 1.9	4.8 ± 1.1	
Lack of spontaneity of speech (1–7)	4.8 ± 0.7	5.5 ± 0.8	
Stereotyped thinking (1–7)	3.0 ± 1.2	4.4 ± 1.3	
Total score of negative symptoms	21.5 ± 2.87	35.3 ± 2.3	$P<0.001$
General psychopathology			
Somatic concern (1–7)	3.1 ± 0.9	5.1 ± 0.7	
Anxiety (1–7)	2.1 ± 1.1	2.1 ± 0.9	
Guilt feelings (1–7)	3.4 ± 1.3	2.9 ± 0.7	
Tension (1–7)	3.9 ± 0.9	3.6 ± 1.1	
Mannerism and posturing (1–7)	4.7 ± 1.7	4.1 ± 1.0	
Depression (1–7)	4.6 ± 1.1	4.7 ± 1.1	
Motor retardation (1–7)	4.9 ± 1.3	2.8 ± 1.1	
Uncooperativeness (1–7)	3.3 ± 0.9	5.1 ± 0.7	
Unusual thought content (1–7)	4.3 ± 2.5	3.2 ± 2.5	
Disorientation (1–7)	3.1 ± 1.1	4.1 ± 0.8	
Poor attention (1–7)	2.2 ± 0.6	4.1 ± 0.5	
Lack of judgement (1–7)	4.9 ± 1.1	4.1 ± 0.7	
Disturbance of volition (1–7)	3.3 ± 1.1	5.1 ± 0.9	
Poor impulse control (1–7)	3.1 ± 0.9	4.9 ± 1.1	
Preoccupation (1–7)	3.1 ± 1.1	3.2 ± 0.7	
Active social avoidance (1–7)	4.0 ± 0.9	3.5 ± 0.3	
Total psychopathology	58.0 ± 1.3	64.6 ± 1.8	$P<0.001$
Grand total score	115.29	128.88	$P<0.001$

many authors [31,40] found that both EOS and LOS were almost similar in terms of the family history of schizophrenia. However, the current study had different findings. There was a significantly lower prevalence of familial loading of schizophrenia among family members of patients with LOS as compared with those with EOS. A similar conclusion was also reached by Fawzi [41] in a comparative study of Egyptian patients with LOS versus EOS.

Medical comorbidity

Psychosis arising *de novo* in the elderly may erroneously be linked solely to age or dementia [42]. Prudent clinicians should not ignore the fact that individuals with LOS have more health problems than young patients. The increased rates of comorbid physical illness in LOS patients are a constant finding, and compared with EOS, patients with LOS have more physical health problems [43]. Musculoskeletal problems are significantly higher in LOS

patients. These exacerbate their physical disabilities, affect their mobility and may contribute towards their social isolation. Schizophrenia with a late onset has also been found to be associated with impaired glucose tolerance and insulin resistance [44].

Several investigators have reported an increased incidence of cardiovascular and pulmonary disease in their LOS patients [45,46]. Cardiovascular diseases are significantly higher in LOS than EOS, with higher rates of respiratory disease-related morbidity and mortality. Respiratory diseases were found to be one of the most frequent causes of medical hospitalization in LOS patients [47]. Moreover, patients with schizophrenia reportedly smoke cigarettes at almost double the rate of the general population [44]. In the current study, there were no differences between both groups in terms of chest diseases. Perhaps this could be attributed to excessive smoking by patients in both groups.

We found that LOS patients were more likely to have visual and auditory impairments than those with an early onset. This has been a consistent finding in the literature [28,48]. It is estimated, for example, that the risk of hearing impairment among patients with LOS was four times greater than that of age-matched and sex-matched controls. This is commonly the conductive rather than the degenerative type [49,50].

Functional assessment

Schizophrenia is one of the most disabling illnesses worldwide, with patients experiencing deficits in a variety of everyday functional domains [51]. Impaired functioning in schizophrenia is a complex phenomenon because it can include a diverse array of problems such as the ability and motivation to perform skills, social functioning and occupational functioning [52]. Interestingly, the nature of psychotic symptoms in schizophrenia was found to have remarkably little association with everyday living functions [53,54,5].

One could expect that the daily functioning among LOS patients would be worse than that in EOS patients; surprisingly, we found that there was no significant difference between LOS and EOS patients in their need for support. This differed from the finding of Cohen *et al*. [19] that the majority of LOS patients were functioning at an intermediate level between the extremes of being fully independent and chronically institutionalized. They found that daily functioning may be associated with better cognitive functioning, fewer negative symptoms, better physical health and independent living in the community [19].

Clinical profile

Positive symptoms

The clinical picture of our LOS group was not quite similar to the EOS group as LOS patients had more positive and fewer negative symptoms. The extent of symptoms' domain in LOS as compared with EOS is still a matter of debate. Although some findings indicated that LOS patients experienced prominently more positive symptoms [55], others described a similar expression of positive and negative symptoms in both LOS and EOS [56].

With respect to delusions, we found that patients with LOS tended to have a complex structure of persecutory, jealousy, hypochondriacal or somatic delusion. Delusions in the EOS patients were mainly bizarre delusions, delusions of persecution, reference, passivity and thought control. Similar findings have been reported by previous investigators [28,32,57].

We observed that conceptual disorganization and formal thought disorders were frequently encountered among our EOS patients compared with LOS patients. This finding has been controversial. Although some investigators have reported the relative absence of formal thought disorder in the late-onset group as compared with EOS [58–63,32], others have reported no difference in the formal thought disorder or other clinical profiles between LOS and EOS [64].

Auditory, olfactory, tactile, visual and gustatory phenomena were observed more in patients with LOS, although there appears to be no direct correlation with specific sensory organ impairment [59,65]. In the current study, the clinical picture in the LOS group was dominated by multimodal hallucination. Although the majority had auditory hallucination, a large number of patients also had olfactory and tactile hallucination, and meanwhile, the EOS group had only auditory hallucination.

Negative symptoms

Rates of negative symptoms were particularly high among the EOS group in this study. This is a consistent finding when these patients are compared with LOS patients. For example, Palmer *et al*. [66] found that 59% of the EOS as compared with only 23% of the LOS patients had negative symptoms. Patients with LOS usually have a lower score on blunting and social withdrawal compared with EOS patients [63,67].

It is important that clinicians evaluate negative symptoms thoroughly, as it could be difficult to distinguish them from the confounding effects of depression, medications, institutionalization and poverty [19].

General psychopathology

From the items of general psychopathology scores it is clear that the LOS group had fewer somatic concern symptoms, more guilt feelings and more depressive symptoms than EOS patients. However, these depressive symptoms did not mount to the diagnosis of comorbid depression.

The rates of depression in LOS are variable in the literature. For example, Graham *et al.* [68] found that 40% of older adults with schizophrenia had a comorbid diagnosis of depression, whereas McNulty *et al.* [55] reported clinically significant depression in 23% of patients. However, Reeves *et al.* [56] found that only 13% of patients had mild depression in a group with LOS. These differing rates of depression among LOS patients

probably reflect the different groups of patients studied and the different scales used.

Diagnostic categories

In agreement with previous studies by Shang *et al.* [61] and Palmer *et al.* [66], our study showed that paranoid schizophrenia was by far the most frequent diagnostic type of schizophrenia encountered in the LOS group, whereas the disorganized and undifferentiated schizophrenia subtypes were the most common diagnoses in the EOS group. The absence of a disorganization dimension in LOS is a major subject that required further studies.

Conclusion

We conclude that LOS differs from EOS in a number of psychosocial and clinical factors. Patients with LOS showed female preponderance, being unmarried or divorced living significantly alone, and had less familial psychiatric history, higher education and better premorbid functioning levels, than their earlier counterparts. Psychotic symptoms in the elderly occur in conjunction with a number of chronic medical illnesses and sensory deficits. However, their daily living function was not significantly impaired.

Clinically, the delayed development of psychosis has been associated with the absence of disorganization symptoms, the presence of systematized delusions, multimodal hallucinations and the relative lack of negative symptoms, formal thought disorder and affective blunting.

The difference in psychopathology and other quantitative and qualitative differences between LOS and EOS suggest that LOS may constitute a separate phenotype within the schizophrenia spectrum [67,69].

There is a window of opportunity to consider all available research data to designate LOS as a formal subtype of schizophrenia or to include it as research diagnostic criteria in the developing ICD-11 and DSM-V.

This move can stimulate more research to help resolve the continuing debate on the nosological status of LOS, to uncover some distinguishing clinical aspects and functional problems in patients with LOS. These data may help draw the attention of policy makers to the unmet needs in this population and the disproportionate skew in services and care offered to patients with LOS.

Limitations

This study is a part of a large research on psychoses in old age [4,5]. This study is one of few Egyptian studies providing insights into the demographic, clinical status and daily functioning in Egyptian patients with LOS versus EOS. The findings of this study may contribute towards a broader understanding of those patients whose subjective experience has been largely ignored, especially in developing countries.

The analysis of this research focused on a cross-sectional comparison. Therefore, we cannot clarify the cause–effect relationship. The sample was relatively small; thus, we could not analyse the putative risk factors implicated in the development of de-novo schizophrenic symptoms after the age of 50 years. The sample of LOS was a selective sample because of the rarity of patients and we recruited them from both the Institute of Psychiatry and the Department of Geriatric Medicine. It was impossible to unify the duration of illness in both groups; thus, our results should be viewed in this context. Another limitation of the present study is that all patients who participated were receiving antipsychotic drugs and thus had relatively low severity of symptoms.

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Conflicts of interest

There are no conflicts of interest.

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الملخص العربي

دراسة مقارنة بين الخصائص السريرية والوظائف الحياتية بين مرضي الفصام متأخر الحدوث مقارنة بالفصام مبكر الحدوث

يعتبر وجود الأمراض الفصامية في كبار السن ظاهرة غير نادرة ولكنها لم تحظ بالاهتمام إلا في الآونة الأخيرة ولما كانت الدراسات المصرية في هذا المجال قليلة في وقتنا الحالي، لذا كان هدفنا في هذا البحث مقارنة الخصائص السريرية والوظائف الحياتية اليومية لخمسين مريضاً من مرضى الفصام الذي حدث متأخراً بعد سن الخمسين عامًا مع عدد مماثل من المرضى الذين يعانون من الفصام مبكر الحدوث قبل سن الخمسين **طرق البحث:** تم تشخيص الحالات باستخدام التصنيف الإكلينيكي حسب الدليل الأمريكي الإحصائي الرابع لتشخيص الأمراض النفسية، بالإضافة إلي التقييم السريري للأعراض الذهانية باستخدام مقياس (PANSS) للأعراض الفصامية الإيجابية والسلبية والسيكوباثولوجية ومقياس كفاءة الحياة اليومية ونشاط الحياة اليومية الأدائية لهؤلاء المرضى كما استخدم التقييم الاجتماعي للحالة الاجتماعية والديموجرافية ومستوى المعيشة في البيئة المصرية باستخدام مقياس (فهمي والشربيني) **النتائج:** أسفرت النتائج عن ارتفاع معدل الفصام في كبار السن من السيدات خاصة غير المتزوجات والمطلقات المقيمات بمفردهن وقد وجد أن معدل حدوث تاريخ عائلي للأمراض النفسية في مجموعة كبار السن أقل من نظرائهم من صغار السن كما أظهرت الدراسة أن مستوى التعليم والأداء الوظيفي في مجموعة كبار السن أفضل من صغار السن ولم تظهر الدراسة فروقاً جوهرية بين المجموعتين عند تقيمهم بمقياس الأداء في نشاط الحياة اليومية والأدائية أما بالنسبة للتقييم السريري للأعراض الذهانية باستخدام مقياس (PANSS) للأعراض الفصامية، فقد حصل أفراد مجموعة كبار السن على درجات أعلى بالنسبة للأعراض الإيجابية للفصام ودرجات أقل للأعراض السلبية وقد أظهر التشخيص الإكلينيكي لمجموعة كبار السن أن 70% عانوا من الفصام البارانويدي ، بينما كانت حالات الاضطرابات الضلالية تشكل 12% أما الفصام غير المميز كانت نسبته 4% كما شكل الفصام الوجداني نسبة 14.%. أما التشخيص الإكلينيكي لمجموعة صغار السن فشمل 8% فصام متبقى ، 16% فصام بارانويدي ، 34% فصام غير مميز ، 36% فصام هيبيفريني ، 6% فصام وجداني وقد خلصت الدراسة لأهمية إعادة تقييم النظم التشخيصية الحالية بحيث يكون الفصام الذي ينشأ لأول مرة في سن متأخر يستحق وضعه في تصنيف نوعي فرعي مع الفصام، ولكن هذا الموضوع يحتاج لمزيد من الدراسة