

## ORIGINAL ARTICLE

## Menarche, puberty and psychiatric disorders\*

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## Abstract

**Objective:** Puberty and adolescence are important periods about mental health, particularly for women. Relationship between age of menarche, psychiatric complaints during adolescence and family stories of psychiatric disorders are investigated.

**Materials and methods:** The study is conducted with 61 patients with schizophrenia, 35 patients with bipolar affective disorder, 40 patients with depressive disorder and 60 healthy control subjects. All subjects were evaluated with SCID-I and questionnaire fit for the aim of the study was fulfilled.

**Results:** Bipolar affective disorder had a stronger relationship with menarche, psychiatric problems during adolescence were related with early onset of illness in schizophrenia and bipolar groups. Family story of psychiatric illness was related with psychological problems during puberty in schizophrenia group.

**Conclusion:** This study underlies the puberty and adolescence period for psychiatric illness. An integrative clinical approach is suggested while examining the psychiatric illness at the basis of engaged roles of hormonal effects of menarche, social effect of puberty psychiatric complaints and genetical and psychosocial burden of family story of illness.

## Keywords

Menarche, psychiatric disorders, puberty, women mental health

## History

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## Introduction

Puberty and adolescence are shown to be sensitive periods about psychological and behavioral problems. Such periods of intense hormonal fluctuations have been associated with heightened prevalence and exacerbation of underlying psychiatric illness [1]. It has been speculated that sex steroids, such as estrogens, progesterones, testosterone and dehydroepiandrosterone, exert a significant modulation of brain functioning, possibly through interactions with various neurotransmitter systems.

Gender differences is a natural difference about hormonal composition of the body hence distribution of psychiatric disorders. Women are more risky about psychiatric complaints than men particularly during almost all reproductive cycles and also during adolescence [2]. Depression is the best representative example which is more common in woman than in men and it particularly occurs at times of hormonal fluctuations. A hormonal triad of premenstrual depression, postnatal depression and climacteric depression is recently defined which is best referred to as 'reproductive depression' [3]. Recent studies utters the misdiagnosis of bipolar depression instead of reproductive depression. So, a 'tragic confusion' about diagnosis and treatment of mood disorders derived from hormonal fluctuations is existent [4]. Menarche and adolescence are the terms in which

such hormonal fluctuations starts. Concurrently, psychiatric complaints start to occur at adolescence. Gender difference proves its importance during this period too. Mental distress is shown to be seen in girls more than boys and seen especially at the ages around 14 [5].

Menarche is investigated as an effective factor at the background of female adolescence problems. Early menarche has been linked to mental health and behavioral problems in several studies [6]. Psychopathological symptoms, suicide and self-harming behaviors are more common in early menarche students than in on-time and late menarche students [7].

Investigations about the associations between menarche age and psychiatric disorders are conducted for a while. For schizophrenia it is shown that the earlier the age at menarche, the later the ages at both the first psychotic symptoms and the first hospitalization but in another study existence of no relation between age of menarche and schizophrenia is shown [8,9]. Age of menarche is also found to be related severity of negative symptoms and course in schizophrenia [9].

Bipolar disorder is another psychiatric disorder shown to have relation with reproductive cycles of women. Women with bipolar disorder is considered to be more vulnerable to mood episodes in the context of reproductive events [10].

In a study, it is shown that the onset of bipolar disorder occurred before menarche in 32% of women; 18% experienced the onset within 1 year of menarche. First episode of bipolar disorders seen 32% of patients before menarche and the in 18 of patients the first episode is seen in 1 year [11]. Previous research has investigated the relationship between pubertal timing and depression in girls, with most results suggesting that earlier menarche predicts more depression in adolescence [12].

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Also advancing pubertal stage is shown to carry higher risks for depressive symptoms in females [13]. Psychological and behavioral problems in puberty is shown to be limited to adolescence in a follow up study and there is not enough studies that show the adolescence psychological problems and future illness [14]. This study comparatively and respectively investigates adults with severe psychiatric disorders; schizophrenia, bipolar affective disorder and unipolar depressive disorder and asks their menarche age, pubertal mental status, family stories of psychiatric illness. Hence, a relationship between menarche age, pubertal mental health and psychiatric disorders in adulthood is investigated comparatively.

## Methods

This study is conducted with 61 patients with schizophrenia, 35 with bipolar affective disorder, 40 with depression and 60 healthy control subjects. An approval of local ethics committee (of university) and written approvals of all participants were received for the study.

The patients are selected from the ones who admitted to psychiatry clinic by randomized sampling method during one year. The patients with a psychiatric diagnosis for at least 6 months and the ones in remission period were included to the study. Control group is consisted from the visitors of hospital with no story or diagnosis of psychiatric diseases. Patients with past or current endocrine diseases, severe organic diseases, mental retardation, alcohol substance dependence and any metabolic conditions which may affect the quality of interview are excluded. All patients and control subjects were assessed with SCID-1. Than a questionnaire about menarche and adolescence properties was fulfilled for all participants.

SCID-1 is a structured clinical interview which is structured for DSM-IV Axis I disorders (SCID-I), a clinical interview scale which is developed and structured for diagnosing DSM-IV Axis I [15]. Structured interview was developed to enable the standard practice of diagnostic evaluation and facilitate the reliability of the diagnosis and scanning DSM-IV diagnostic criteria and increase the validity of the diagnoses, and investigate the symptoms systematically. The adaptation and reliability studies of SCID-I for Turkey was done by Çorapçioğlu et al. [16].

Questionnaire about menarche and adolescence includes questions about sociodemographical data, the age of first menstruation, any psychiatric diagnosis as psychotic disorder, depressive disorder, eating disorders, etc. during adolescence or any psychiatric complaints as identity problems, problems with school or choosing occupation, leaving home, sexual problems, alcohol drug abuse and other psychiatric complaints.

## Statistical evaluation

In the statistical evaluation and examination of this study, Minitab Statistical Package Program (Main Frame Computer with IBM 4381 VM/SP operating system was used) and chi-square test, variance analysis and interratio difference test was applied in the analysis of the data.

## Results

The mean age of subjects in schizophrenia group was  $29.7 \pm 9.8$ , in Bipolar Affective Disorder Group was  $28.6 \pm 9.0$ , in depression group was  $32.1 \pm 9.2$  and in control group was  $30.8 \pm 8.6$  and there were no significant difference between groups.

Mean age of onset of illness was 24.07 in schizophrenia group; 21:17 in BAD group and 28.42 in depressive group. The difference between groups was significant ( $p < 0.01$ ,  $F: 7.76$ )

Table 1. The relationship between age of menarche and the early or late onset of illness.

	Schizophrenic group		Bipolar group		Depressive group	
	n	Age of menarche	n	Age of menarche	n	Age of menarche
Onset before 16 years old	20	13.05	15	14.07	10	13.30
Onset after 16 years old	41	13.40	20	13.21	30	13.77

$F = 1.40$   $p > 0.05$ ,  $F = 4.67$   $p < 0.05$ ,  $F = 0.43$   $p > 0.05$

Table 2. The existence of mental problems during puberty at groups.

	Schizophrenic group		Bipolar group		Depressive group		Control group	
	%	n	%	n	%	n	%	n
MHPP +	68.85	42	54.39	19	62.50	25	86.67	52
MHPP –	31.15	19	45.61	16	37.50	15	13.33	8

$kk = 13.25$ ;  $SD = 3$ ;  $p < 0.01$ . MHPP: Mental health problems in puberty.

The mean menarche age of groups were 13.30 for schizophrenic group, 13.57 for BAD group, 13.65 for depression group and 13.44 for control group, the difference was not significant. The menarche age distribution of groups were between ages 12–19 and there was no significant difference ( $kk = 23.201$ ,  $SD = 15$ ,  $p > 0.05$ ). The youngest menarche age (9) and the latest one (20) were both in depression group.

The relationship between age of menarche and age of onset of illness is investigated. The groups are divided into two; as onset of illness before age 16; and onset of illness after age 16. The age of menarche was significantly higher at the early onset bipolar group than other groups. (Table 1).

While the subjects were asked for the experience of psychiatric problems during puberty; respectively the BAD group, schizophrenia group and depression group had significantly higher existence of problems than control group (Table 2).

Also when relationship between the age of onset of illness as before 16 (early) and after 16 (late) and existence of mental health problems during puberty was sought the BAD group had a very significant relation ( $F = 4.27$ ,  $p < 0.01$ ) also schizophrenia had a significant relationship ( $F = 2.72$ ,  $p < 0.05$ ) between early onset of illness and existence of problems during puberty (Table 3).

Relationship between having family history of a psychiatric illness and experiencing puberty problems is investigated. The schizophrenic patients with family story of a psychiatric illness had more psychological problems during puberty than others (Table 4).

## Discussion

### General data

This study is focused to menarche age, existence of mental problems in puberty and family story of the patients with schizophrenia, BAD, depressive disorder and the control group.

The onset of illness of the subject in our study was the earliest in BAD and the latest in depressive group. This result seems parallel with literature [17,18]. The mean menarche age is found to be 13.30 in schizophrenics, 13.57 in bipolars, 13.65 in depressives, 13.44 in controls. Previously, the mean menarche age is found in 12.78 and 12.74 in two different studies conducted in Turkey with the interval of 26 years [19,20]. In a previous study which examined the menarche age for whole Turkey, mean age at menarche was estimated as 13.30 [21]. In this study, the menarche

Table 3. Relationship between problems during puberty – age onset of illness.

	Schizophrenic group*				Bipolar group†				Depressive group‡			
	Before age 16		After age 16		Before age 16		After age 16		Before age 16		After age 16	
Onset of illness	%	n	%	n	%	n	%	n	%	n	%	n
MHPP +	45.00	9	80.49	33	26.67	4	75.00	15	40.00	4	20.00	21
MHPP –	55.00	11	19.51	8	73.33	11	25.00	5	60.00	6	80.00	9

MHPP: Mental health problems in puberty.

\* $\chi^2 = 7.89$ ;  $SD = 1$ ;  $p < 0.01$ .

† $\chi^2 = 8.07$ ;  $SD = 1$ ;  $p < 0.01$ .

‡ $\chi^2 = 2.88$ ;  $SD = 1$ ;  $p > 0.05$ .

Table 4. The relationship between family history of psychiatric illness and puberty problems.

	Schizophrenic group*				Bipolar group†				Depressive group‡				Control group¶			
	MHPP–		MHPP+		MHPP–		MHPP+		MHPP–		MHPP+		MHPP–		MHPP+	
	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
FH –	64.29	27	36.84	7	68.42	13	62.50	10	76.00	19	53.33	8	67.31	35	62.50	5
FH +	35.71	15	63.16	12	31.58	6	37.50	6	24.00	6	46.77	7	32.69	17	37.50	3

MHPP: Mental health problems in puberty. FH: existence of family history of psychiatric illness.

\* $\chi^2 = 3.99$ ;  $SD = 1$ ;  $p < 0.01$ .

† $\chi^2 = 0.04$ ;  $SD = 1$ ;  $p < 0.01$ .

‡ $\chi^2 = 2.20$ ;  $SD = 1$ ;  $p > 0.05$ .

¶ $\chi^2 = 0.07$ ;  $SD = 1$ ;  $p > 0.05$ .

age was at the upper limits of Turkey for all groups. A study showed that lower socioeconomic status is associated with higher menarche age [22]. And, it is speculated that being in urban area and living western of Turkey is related with earlier menarche age [21]. The late menarche age of our subjects may be due to place of the study; east of Turkey which is known to present relatively lower socioeconomic condition to the other parts of the country.

### Menarche age – bipolarity

Puberty is a period just hormonal levels of the body changed and in previous studies interaction of these changes are shown to affect mood [23]. Periods of intense hormonal fluctuations have been associated with heightened prevalence and exacerbation of underlying psychiatric illness, Premenstrual dysphoria and postpartum depression are major evidence of this mood disturbances interacted with hormonal levels [1,23]. Premenstrual dysphoric disorder is recently discussed for the detailed differential diagnosis from BAD and also premenstrual depression is confused with bipolar depression. This confusion reminds the reality that all these diseases may be affected by hormonal parameters [10, 24]. Verily, bipolar disorder has not a few evidence about interactions of hormones and mood disturbances [10]. In this study, age of menarche is found to have a relationship with BAD. The ones whose mean menarche age is 14.07 had more number of onset of illness before the age 16. Age of 16 and menarche age of 14.07 are closed periods in life suggest a hormonal relationship between age of onset of illness and puberty timing. This results present a glance to the relationship between BAD and hormonal fluctuations.

### Problems in puberty – all groups especially bipolarity

Puberty and adolescence suggest a vulnerability for psychiatric complaints [5]. In previous studies; psychiatric problems during adolescence is founded to be more in schizophrenic patients [25], and the ones with psychiatric problems during childhood or

adolescence had a higher risk for earlier onset of psychosis and BAD [26,27]. This study investigates the association between existence of psychiatric complaints during puberty and severe psychiatric illnesses as schizophrenia, BAD and Depression in comparative way. Relationship between psychiatric disorders (schizophrenia, BAD, Depression) at adult age and psychiatric complaints during adolescence is found to be significant in this study. Bipolar Affective Disorder had a stronger association than others in this study. Schizophrenic and depressive group showed an association between having adolescence problems and earlier onset of illness.

The association between puberty problems and psychiatric disorders suggests a psychopathology under the effect of hormonal fluctuations of menarche. Also, genetical issues and environmental factors that prepare a background for both mental problems in puberty and psychiatric disorders in adulthood should be investigated.

In this study, problems of puberty are found to be more in schizophrenics with a family story of psychiatric illness. The genetic burden of schizophrenia nictates here as a cause for problematic puberty and existence of schizophrenia. There is a failure of previous studies to observe gender differences in familial risk, given the gender differences in population prevalence, may reflect the fact that a greater proportion of schizophrenia in women than in men is attributable to nonfamilial environmental risk factors [28]. The psychosocial burden of being a relative of psychologically ill patient is shown in previous studies, also number of psychiatric complaints increases in relatives of psychiatric patients [29]. The association between puberty and familial problems and schizophrenia and also other psychiatric disorders needs to be investigated.

### Conclusion

Menarche age and psychological problems during adolescence seems to be related with onset timing of psychiatric disorders. The association seems stronger with puberty and bipolar affective

disorder. Family story of psychiatric illness was related with psychological problems during adolescence in schizophrenia group. The genetic burden of schizophrenics and sensitivity of bipolar to hormonal changes may be underlined by the lightening of study. Therefore, awareness about the relationship between puberty and adolescence properties of patients with their psychiatric disorder may open an approach for a better understanding and treatment.

### Declaration of interest

The authors report no declarations of interest.

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