ORIGINAL ARTICLE

# Comparison of demographic and clinical characteristics between children and adolescents with major depressive disorder

# Comparação de características demográficas e clínicas entre crianças e adolescentes com transtorno depressivo maior

**Lee Fu-I,**[1] **Yuan Pang Wang**[2,3]

*Abstract*

***Objective:*** *To compare clinical characteristics of major depressive disorder symptoms between children and adolescents.* ***Method****: The subjects were 58 patients of a Child and Adolescent Affective Disorder Clinic consecutively admitted during a six-month period. Children aged 5-9 years old and adolescents from 10-17 years old currently meeting DSM-IV criteria diagnosis of major depressive disorder were chosen. Current MDD diagnosis and depressive psychopathology were assessed by a clinical interview and the Diagnostic Interview for Children and Adolescents-DSM-IV version. The Children's Depression Rating Scale-Revised Version and the Children Global Assessment Scale rated the severity and global functioning of major depressive disorder.* ***Results:*** *The most common depressive symptoms were: anhedonia (72.4%), depressed mood (72.4%), decreased concentration (62.1%), and irritability (58.6%). The intensity of depressive episodes of this sample ranged from mild to moderate. Fifty percent reported thoughts of death, and 29.3% presented a variety of psychotic symptoms. When compared with children, adolescents reported a significantly more depressed mood ($p = 0.043$), lower self-esteem ($p = 0.002$), and had more difficulty concentrating ($p = 0.020$). Female adolescents had lower self-esteem ($p = 0.003$), and male adolescents showed more decreased concentration ($p = 0.016$).* ***Conclusion:*** *This study suggests that age and gender differences might influence the clinical presentation of major depressive disorder in children and adolescents. Further studies with larger samples are needed.*

***Descriptors:*** *Child; Adolescent; Depressive symptoms; Suicide; Psychotic disorders*

*Resumo*

***Objetivo:*** *Comparar as características clínicas de transtorno depressivo maior entre crianças e adolescentes.* ***Método:*** *Amostra constituída de 58 sujeitos admitidos consecutivamente em um serviço especializado em transtornos do humor na infância e adolescência durante um período de 6 meses. Foram considerados crianças sujeitos com idade entre 5 e 9 anos, e adolescentes aqueles com idade entre 10 e 17 anos. Todos os participantes preenchiam diagnóstico de transtorno depressivo maior seguindo os critérios de DSM-IV. O diagnóstico de transtorno depressivo maior e avaliação de aspectos psicopatológicos foram realizados por entrevista clínica direta e aplicação de entrevista de apoio ao diagnóstico. O funcionamento global e a gravidade dos sintomas depressivos foram mensurados através de versões adaptadas de* Children's Depression Rating Scale–Revised Version *e* Children Global Assessment Scale*.* ***Resultados:*** *Os sintomas depressivos mais freqüentes foram: anedonia (72,4%), humor depressivo (72,4%), diminuição de concentração (62,1%) e irritabilidade (58,6%). A intensidade do episódio depressivo dessa amostra variou de leve a moderada. Cinqüenta por cento relataram pensamentos mórbidos e 29,3% apresentaram sintomas psicóticos variados. Quando comparados com crianças, adolescentes apresentaram significativamente mais humor depressivo ($p = 0,043$), baixa auto-estima ($p = 0,002$) e mais dificuldade de concentração ($p = 0,020$). As adolescentes femininas tinham mais baixa auto-estima ($p = 0,003$) e os masculinos mostraram mais diminuição de concentração ($p = 0,016$).* ***Conclusão:*** *Esse estudo sugere que idade e gênero poderiam influenciar na apresentação clínica de transtorno depressivo maior em crianças e adolescentes. Estudos com amostra mais representativa serão necessários.*

***Descritores:*** *Criança; Adolescente; Sintomas depressivos; Suicídio; Transtornos psicóticos*

[1] Child and Adolescent Psychiatry Service, Department & Institute of Psychiatry, School of Medicine, Universidade de São Paulo (USP), São Paulo (SP), Brazil
[2] Department & Institute of Psychiatry, Medical School, Universidade de São Paulo (USP), São Paulo (SP), Brazil
[3] Department of Psychiatry, Medical School, Universidade de Santo Amaro (UNISA), São Paulo (SP), Brazil

Financial support: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) research grants 02/03383-3; FAPESP had no further role in the study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.
Conflict of interests: Dr. Lee Fu-I has consulted for the ABBOTT expert testimonial.
Submitted: October 1, 2007
Accepted: February 27, 2008

**Correspondence**
Lee Fu-I
Alameda Ministro Rocha Azevedo, 464, apto. 91
01410-000
São Paulo, SP, Brasil
Phone: (55 11) 3064-4948 Fax: (55 11) 3062-6580
E-mail: leefui@terra.com.br

## Introduction

Numerous studies have been accomplished on the effect of the cognitive, psychosocial, and biological development level in children and adolescents' vulnerability to major depressive disorder (MDD). Nonetheless, it is still difficult to find a consensus regarding the differences between MDD psychopathology in children and adolescents, the rates of depressive symptoms, and other associated phenomenology.[1-5] Studies have shown adolescents as presenting more depressive symptoms. For instance, Sorense and Thomsen investigated a clinical sample (n = 42) and found adolescents presented significantly more anhedonia, hypersomnia and also had more difficulty concentrating than children.[4] In contrast, feelings of worthlessness were more frequently observed among children. These studies suggest the developmental effects for MDD.[4,6,7]

In addition, Bennett et al. investigated an outpatient sample (n = 383, age range 11.9 to 20.0) and observed a significantly more depressed mood, sleep problems, fatigue, guilt, concentration problems, helplessness, self-disappointment and body image dissatisfaction among depressed female adolescents. In contrast, depressed male adolescents presented significantly more anhedonia and depressed mood in the morning than females.[8] Li, DiGiuseppe and Froh recently concluded, after investigating the roles of problem-focused coping in 246 adolescents, that girls are more emotion-focused and ruminative when coping than boys, and a large degree of ruminative coping was related to a high level of depressive symptoms.[9] Such findings are consistent with studies that show gender differences previously found among depressed adults may also be observed in youths.[9,10]

The lack of an agreed-upon method for determining MDD in children accounts for a variation in description, also making it hard to define the impact of age and the level of development on the phenomenology of MDD.[1,7] Consequently, there are several theories regarding developmental effects on depressive symptomatology, e.g. whether children have the cognitive capability and linguistic ability to develop and express depressive symptoms, or whether depressive symptoms might reflect variations in ages, while the core underlying constructs remain the same.[1,4,6,7] There are other noteworthy theories such as the Hopelessness Theory,[11] the Hypothesis of Age-related Genetic Aetiology Reaction to Negative Life Events[12] and the Negative Rumination Style Cognition Theory.[13]

MDD is a drawn-out illness that constitutes an increasing public heath concern and an important risk factor for children and adolescents because it may cause psychosocial and developmental impairment.[6,14-17] A recent meta-analysis study reported that the onset of MDD in children has a chronic and episodic course, which increases the subsequent depressive episodes that occur later in the patient's adolescence adulthood. The recurrence rates may range from 45% to 72% over 3 to 7 years.[18]

This study aims to investigate symptomatic characteristics of MDD in a Brazilian clinical sample of depressed children and adolescents. Additional non-depressive psychopathology and depressive psychopathology of these age groups and genders were examined.

## Method

### 1. Subjects

The study was performed in the Children and Adolescents Affective Disorder Outpatient Clinic at the Childhood and Adolescence Psychiatry Service at the Institute of Psychiatry (ATA-SEPIA-IPq) of the Universidade de São Paulo, Brazil.

The original sample was comprised of 72 first-contact patients consecutively admitted to ATA-SEPIA-IPq between August 1st 2002 and January 31st 2003. To be eligible for the study, subjects had to be children and adolescents (both genders), 5 to 17 years old at index time, having met DSM-IV[19] criteria for current MDD.

The following conditions were adopted as exclusion criteria for this study: 1) chronic medical illness or mental and/or physical handicap; 2) a previous clinical history of manic episode or bipolar disorder; 3) a previous clinical history of substance dependency or substance abuse in the last two weeks; 4) pervasive development disorder; 5) a previous clinical history of schizophrenia or a severe psychotic disorder; 6) institutionalized or homeless subjects 7) mental retardation, and substantial learning difficulties or academic failure; 8) being unable to complete all clinical interview procedures. Applicants with mental retardation or pervasive developmental disorder were excluded after a brief clinical face-to-face interview involving a developmental narration and an assessment of their learning history and school records.

From the original sample, we excluded 12 subjects who did not meet DSM-IV criteria for MDD, and presented psychiatric conditions other than MDD at the index time. We also excluded two subjects who were unable to complete the entire clinical interviews and research procedures. The final sample was comprised of 58 children and adolescents.

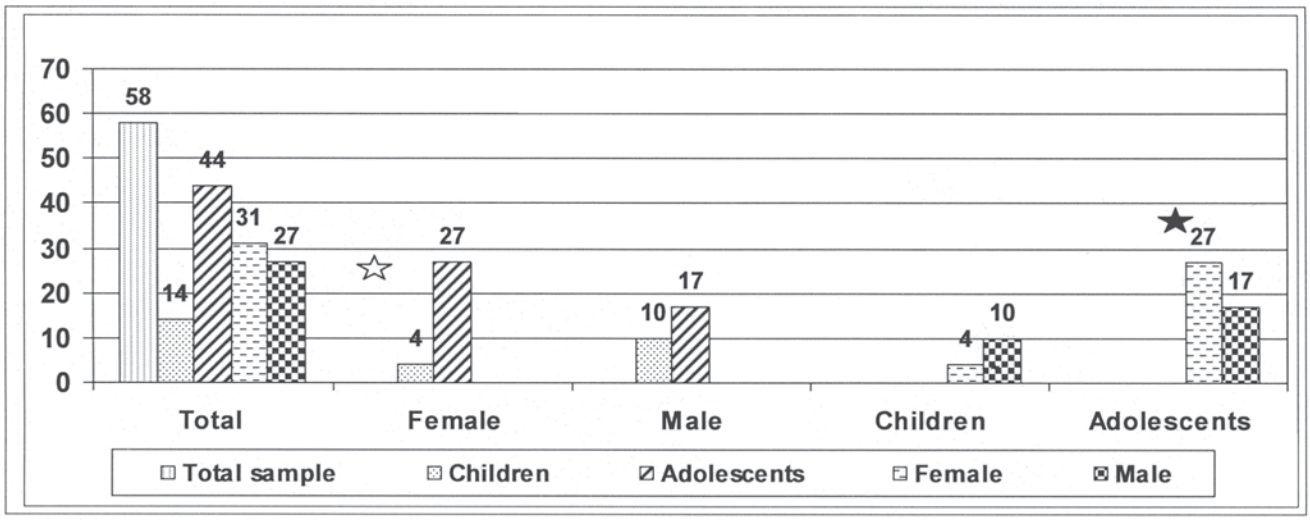
The mean age for this sample was 12.8 yo. (SD = 3.1, ranged [6-17]). Figure 1 shows the demographic characteristics of the total sample. There were 14 children and 44 adolescents, and the ratio of males (n = 27) and females (n = 31) in this sample was similar (1:1.15). Female adolescents constitute the largest sub-group in this sample (n = 27), followed by the male adolescent sub-group (n = 17), male children or boys (n = 10) and female children or girls (n = 4). Among adolescents, there were significantly more (p = 0.032) females (n = 27) than males (n = 17)(Figure 1), and among children there were more boys (n = 10) than girls (n = 4). Among females, there were significantly more (p = 0.032) adolescents (n = 27) than children (n = 4) (Figure 1). The mean age of male subjects (11.4 yo., SD = 2.9) was significantly lower (p = 0.001) than females' mean age (14.0 yo., SD = 2.7). Most patients were at medium-low socioeconomic status (89.0%), and there were no significant differences of socioeconomic status between sub-groups.

Subjects were classified in two developmental groups based on the WHO's chronological definition[20] - subjects younger than 10 yo. were considered children, and adolescents were the ones aged 10 years or above. Patients and their parents or legal guardians signed informed consent forms. This research project was approved by the Universidade de São Paulo's Ethics Committee in August 2001.

### 2. Clinical assessment

Subjects' current depression diagnoses and depressive psychopathology were ascertained by clinical interview and standardized instrument. All clinical assessments for psychiatric diagnoses were based on data collected by a face-to-face clinical interview that was performed directly by the principal investigator with the patients and their parents separately. The subjects' current depression diagnoses and psychiatric features were ascertained by a clinical interview with the patients and their parents, performed directly by the principal investigator.

The DSM-IV version of Diagnostic Interview for Children and Adolescent DSM IV version – DICA IV[21] was conducted by experienced clinical researchers, for children or adolescents, and their parents separately. This procedure was especially useful to uncover concurrent psychiatric diagnoses. The DICA-IV was




☆ (p = 0.032); ★ (p = 0.032)

**Figure 1 – Demographic characteristics of depressive children and adolescents (n = 58)**

designed to cover most DSM-IV's axis 1 diagnostic categories such as attention-deficit/hyperactivity disorder (ADHD); oppositional defiant disorder (ODD); conduct disorder; alcohol/substance use disorders; anxiety disorders; obsessive-compulsive disorder (OCD), and eating disorder.[21]

The Children's Depression Rating Scale – Revised Version (CDRS-R)[22] scale rates 17 depressive symptoms and 4 observed signs, and measures the severity of depressive symptoms as an ordinal score, categorized as non-depressed (0-54), mild (55-64), moderate (65-74), severe (75-84), and very severe (> 84).[22] Trained interviewers under the supervision of the principal investigator performed the score of MDD severity (CDRS-R).

The Children's Global Assessment Scale (CGAS)[23] measures global functional status on a scale of 0-100, recording the worst level of functioning for the last 2-week period. A score ranging from 91-100 reflects superior functioning, 81-90 good functioning, 71-80 slight impairment, 61-70 some difficulty in a single area, but generally well, 51-61 sporadic difficulties, 41-50 moderate interference or severe impairment in one area, e.g. suicidal ruminations, 40-31 major impairment in several areas, 21-30 unable to function in all areas, 11-20 needs considerable supervision, and 10-0 needs constant supervision. Trained interviewers, also under the supervision of the principal investigator, performed the score of global functioning (C-GAS).

All researchers were trained for calibration purposes in DICA-IV, CDRS-R and C-GAS. All additional information was obtained from clinical records by the attending child psychiatrist under supervision of the principal investigator.

### 3. Statistical analysis

The frequency of depressive symptoms, suicidal behaviors, psychotic symptoms and manic symptoms for the total sample, for the age and gender subgroups were analyzed descriptively. These variables were subjected to internal consistency analysis by Cronbach's alpha coefficient to assess the reliability of the construct under study.

For comparison purposes, 24 depression variables and 6 psychosis variables were extracted from DICA-IV and CDRS-R. Clinical pattern, age and gender difference for MDD, severity measure of MDD (CDRS-R) and global functioning (C-GAS) were also described. Comorbidity patterns between psychiatric diagnosis and MDD were described in terms of proportion, for total sample and age group. The following standard statistic tests were used for between-group comparison purposes: chi-square test; Fisher's exact test; Students' independent sample $t$ – test; Mann-Whitney test, and Kruskal-Wallis test.

The Student's t test was used to analyze the mean age difference between age, genders and ages-plus-gender sub-groups. The Chi-square test was used to compare the demographic and mostly MDD symptoms between the age and gender sub-groups. Fisher's exacts test was used to compare demographic and MDD symptoms between age-plus-gender sub-groups (girls, boys, female adolescents and male adolescents).

Fisher's exact test was used to compare suicidal acts, visual hallucination, olfactory hallucination, persecutory delusion, telepathic messages and passivity delusion between genders sub-groups. Fisher's exact test was also used to compare anhedonia, nightmares, early-awakening, hypersomnia, suicidal ideation, suicidal planning, suicidal acts and psychotic symptoms between children and adolescents.

A Mann-Whitney non-parametric test was used to compare MDD severity and global functioning between age sub-groups and gender sub-groups. A Kruskal-Wallis non-parametric test was used to compare MDD severity and global functioning between the four age-plus-gender sub-groups.

All analyses were performed through software SPSS package.

## Results

The homogeneity of the construct of depression, as extracted from DICA-IV and CDRS-R, was evaluated by Cronbach's alpha coefficient of internal consistency, with a figure of 0.83 (data not shown). When the psychotic symptom items were excluded, Cronbach's alpha coefficient slightly improved to 0.84. This demonstrates that the 24 depressive symptoms could consistently assess the underlying construct of MDD.

**Table 1 - Comparison of psychopathological characteristic, comorbidity, global functioning (C-GAS), and severity (CDRS-R) between depressed children and adolescents**

| Variable | n | % Total (n = 58) | % Children (n = 14) | % Adolescents (n = 44) | p |
|---|---|---|---|---|---|
| **Clinical symptoms** | | | | | |
| Depressed mood | 42 | 72.4 | 50.0 | **79.6** | **0.043** |
| Crying-Tearful | 33 | 56.9 | 57,1 | 56.8 | NS |
| Anhedonia | 42 | 72.4 | 71.4 | 72.7 | NS |
| Irritability | 34 | 58.6 | 57.1 | 59.1 | NS |
| Decreased appetite | 30 | 51.7 | 50.0 | 52.3 | NS |
| Increase appetite | 21 | 36.2 | 35.7 | 36.4 | NS |
| Initial insomnia | 28 | 48.3 | 50.0 | 47.7 | NS |
| Nightmares | 17 | 29.3 | 35.7 | 27.3 | NS |
| Early awakening | 19 | 32.8 | 35.7 | 31.8 | NS |
| Hypersomnia | 20 | 34.5 | 21.4 | 38.6 | NS |
| Psychomotor agitation | 33 | 56.9 | 50.0 | 59.1 | NS |
| Psychomotor retardation | 27 | 46.6 | 35.7 | 50.0 | NS |
| Fatigue | 33 | 56.9 | 42.8 | 61.4 | NS |
| Low self-esteem | 33 | 56.9 | 21.4 | **68.2** | **0.002** |
| Excessive guilt | 36 | 62.1 | 35.7 | 61.3 | NS |
| Decrease concentration | 36 | 62.1 | 35.7 | **70.5** | **0.020** |
| Difficulty making decision | 21 | 36.2 | 28.6 | 38.6 | NS |
| Hopelessness | 28 | 48.3 | 28.6 | 54.6 | NS |
| Manic symptom | 15 | 25.9 | 28.6 | 31.8 | NS |
| Somatic complains | 18 | 31.0 | 35.7 | 22.7 | NS |
| Thoughts of death | 29 | 50.0 | 50.0 | 50.0 | NS |
| Wishing to be dead | 22 | 37.9 | 28.6 | 40.9 | NS |
| Suicidal thoughts | 15 | 25.9 | 14.3 | 29.6 | NS |
| Suicidal planning | 12 | 20.7 | 14.3 | 22.7 | NS |
| Suicidal attempts | 10 | 17.2 | 21.4 | 15.9 | NS |
| Psychotic symptom | 17 | 29.3 | 28.6 | 29.6 | NS |
| - Visual hallucination | 7 | 12.1 | 14.3 | 11.4 | NS |
| - Auditory hallucination | 12 | 20.7 | 14.3 | 22.7 | NS |
| - Olfactory hallucination | 10 | 17.2 | 7.1 | 9.1 | NS |
| - Persecutory delusion | 10 | 17.2 | 28.6 | 13.6 | NS |
| - Telepathic message | 5 | 8.6 | 14.3 | 6.8 | NS |
| - Passivity delusion | 3 | 5.2 | 7.1 | 4.6 | NS |
| **Comorbidity** | | | | | |
| Some comorbidity | 52 | 89.6 | - | - | - |
| Multiple comorbidities | 37 | 63.8 | - | - | - |
| - Dysthymia | 30 | 51.7 | 35.7 | 56.8 | NS |
| - ADHD | 24 | 41.4 | 35.7 | 43.2 | NS |
| - OCD | 17 | 29.3 | 21.4 | 31.8 | NS |
| - Separation anxiety | 24 | 41.4 | 35.7 | 43.2 | NS |
| - Social phobia | 9 | 15.5 | 14.3 | 15.9 | NS |
| - GAD | 11 | 19.0 | 7.1 | 22.7 | NS |
| - Specific phobia | 12 | 20.7 | 7.1 | 25.0 | NS |
| **Global Function (C-GAS)** | – | – | 46.7 (SD=5.1) | 42.4 (SD=7.9) | NS |
| **Severity (CDRS-R)** | – | – | 54.1 (SD=11.6) | 60.3 (SD=12.1) | NS |

*ADHA = attention deficit hyperactivity disorder; GAD = generalized anxiety disorder; OCD = obsessive -compulsive disorder; C-GAS = Children global Assessment Scale; CDRS-R = Children Depression Ranting Scale-Revised version; SD: Standard Deviation*

This analysis of internal consistency intended to carefully evaluate the consistency of the depressive construct we assessed. We had no intention of evaluating psychometric properties of DICA or CDRS-R, since the analyzed items were extracted from DICA and complemented with CDRS-R items, and it would therefore be beyond the scope of this paper to draw such a conclusion.

The frequency of depressive symptoms of the total sample (n = 58) and age groups (children and adolescents groups) is shown in Table 1. Anhedonia (72.4%), depressed mood (72.4%), excessive guilt (62.1%), decreased concentration (62.1%) and irritability (58.6%) were the most common depressive symptoms. Fifty percent of depressed patients had thoughts of death, 37.9% wished to be dead, and 25.9% presented suicidal ideation. Of note also, the rate of suicide plan (20.7%) and suicidal attempts (17.2%).

Even when excluding subjects with a previous manic episode or bipolar disorder diagnosis, 25.9% of patients still presented some manic symptoms, but did not meet the DSM-IV criteria for a manic episode. There were no differences between occurrences of these manic symptoms between age and gender groups. One over three patients (29.3%) also presented psychotic symptoms concurrently with MDD. It should be noted that these psychotic symptoms observed among depressed patients did not meet the DSM-IV criteria for schizophrenia or schizophreniform conditions (less than 6 months). The psychotic symptoms most frequently observed in this sample were auditory hallucination (20.7%), olfactory hallucination (17.2%) and persecutory delusion (17.2%).

Almost ninety percent of the patients presented at least one comorbid condition, and 63.8% patients presented two or more comorbidities. Fifty-five percent presented anxiety spectrum comorbidity, whereas 51.7% reported symptoms meeting the diagnosis for current dysthymia (Table 1). The other remarkable comorbidity conditions were ADHD 41.4%; separation anxiety

**Table 2 - Clinical characteristics, global functioning (C_GAS), and severity (CDRS_R) comparison between age and gender groups**

| Clinical characteristics % | Girls (n = 4) | Boys (n = 10) | Female adolescent (n = 27) | Male adolescent (n = 17) | p |
|---|---|---|---|---|---|
| Depressed mood | 26.0 | 60.0 | 81.5 | 76.5 | NS |
| Crying / tearful | 75.0 | 50.0 | 66.7 | 41.2 | NS |
| Anhedonia | 25.0 | 90.0 | 77.8 | 64.7 | NS |
| Irritability | 75.0 | 50.0 | 59.3 | 58.8 | NS |
| Decreased appetite | 50.0 | 50.0 | 51.9 | 52.9 | NS |
| Increased appetite | 25.0 | 40.0 | 25.9 | 52.9 | NS |
| Initial insomnia | 50.0 | 50.0 | 48.2 | 47.1 | NS |
| Nightmares | 25.0 | 40.0 | 29.6 | 23.5 | NS |
| Early awakening | 00.0 | 50.0 | 33.3 | 29.4 | NS |
| Hypersomnia | 00.0 | 30.0 | 40.7 | 35.3 | NS |
| Psychomotor agitation | 25.0 | 60.0 | 63.0 | 52.9 | NS |
| Psychomotor retardation | 25.0 | 40.0 | 48.2 | 52.9 | NS |
| Fatigue | 50.0 | 40.0 | 70.4 | 47.1 | NS |
| Low self-esteem | 00.0 | 30.0 | **77.8** | 52.9 | **< 0.005** |
| Excessive guilt | 00.0 | 50.0 | 63.0 | 58.8 | NS |
| Decreased concentration | 00.0 | 50.0 | 63.0 | **82.4** | **0.016** |
| Difficulty making decision | 25.0 | 30.0 | 29.6 | 52.9 | NS |
| Hopelessness | 25.0 | 30.0 | 55.6 | 52.9 | NS |
| Thoughts of death | 00.0 | 70.0 | 44.4 | 58.8 | NS |
| Wishing to be dead | 25.0 | 30.0 | 37.0 | 47.1 | NS |
| Suicidal thoughts | 25.0 | 10.0 | 22.2 | 41.2 | NS |
| Suicidal planning | 25.0 | 10.0 | 18.5 | 29.4 | NS |
| Suicidal attempts | 25.0 | 20.0 | 14.8 | 17.7 | NS |
| Psychotic symptom | 25.0 | 30.0 | 29.6 | 29.4 | NS |
| - Visual hallucination | 00.0 | 20.0 | 11.1 | 11.8 | NS |
| - Auditory hallucination | 25.0 | 10.0 | 25.9 | 17.7 | NS |
| - Olfactory hallucination | 25.0 | 00.0 | 11.1 | 5.9 | NS |
| - Persecutory delusion | 25.0 | 30.0 | 14.8 | 11.8 | NS |
| - Telepathic message | 25.0 | 10.0 | 7.4 | 5.9 | NS |
| - Passivity delusion | 00.0 | 10.0 | 3.7 | 5.9 | NS |
| C_GAS (mean, SD) | 43.5(5.0) | 48.0(4.8) | 43.6(7.1) | 40.4(9.0) | NS |
| CDRS_R (mean, SD) | 59.8(9.5) | 51.8(12.0) | 59.4(11.7) | 61.5(13.0) | NS |

*C-GAS: Children's Global Assessment Scale; CDRS-R: Children's Depression Rating Scale – Revised Version; SD: Standard Deviation*

41.4%; OCD 29.3%; generalized anxiety disorder 19.0%. There was no difference in comorbidity between age groups (Table 1).

The depression level for the entire sample was severe (CDRS-R mean = 74.8; SD = 7.9), ranging from mild to very severe (56-85). The global functioning level was moderate with severe impairment interference in one area (C-GAS mean= 43.4; SD = 7.6).

Regarding the age sub-groups, Table 1 also shows that adolescents presented significantly more depressed mood (p = 0.04), lower self-esteem (p = 0.002), and decreased concentration (p = 0.02) than children. Table 2 shows that female adolescents present significantly lower self-esteem (p = 0.003), and the male adolescents seem to have significantly more decreased concentration (p = 0.016) than other groups. There was no difference of suicidal behavior rates between age and gender groups, and there was no more significant difference between age and gender groups. Of note also, there was no difference concerning symptom severity and global functioning between genders, children and adolescents, or between the four groups (Table 2).

## Discussion

Our results underscore the clinical presentation of depressive symptoms, which might alter between childhood and adolescence. The diagnosis of a current depressive episode was found in two boys at the early age of 6 years. In addition to depressive psychopathology, suicidal behavior and psychotic symptoms were also observed in this sample. Our sample is composed of moderate to severely impaired youths. The reliability of detecting MDD in this symptom-based non-adult sample could be validated by a high Cronbach's alpha coefficient, indicating the homogeneity of the construct we studied.

The predominance of boys among children (< 10 yo.) and females among adolescents (> 10 yo.) in our sample is consistent with similar studies,[4,6,17] and suggests that MDD rises rapidly after puberty in females, but not to the same extent in boys.[8,10] This phenomenon may be explained by a vulnerability created by the interaction of heightened affective need and puberty transition difficulties of female adolescents.[10] Studies suggest that gender difference is likely to involve both biological and psychosocial factors.[24,25] Girls and adolescent females may have more risk factors for depression than males. In particular, females report more interpersonal life events and tend to respond to sad moods with ruminative symptoms. This psychological factors accompany biological, hormonal and psychosocial changes.[25] There will be more discussion regarding age-plus-gender developmental influence in MDD in the next sections.

The higher rates of anhedonia and depressed moods observed in the present study differ slightly from similar existing studies.[2,3,26] Anhedonia and depressed mood have been reported as core depressive symptoms for people of all ages, and both are considered as a "*heterotypic continuity*" symptom.[1,6,7] That is, there may be developmental differences in how symptoms are expressed, but the symptoms do not differ when considered as a higher-level construct.[1,7,27] On the other hand, irritability is a non-specific symptom, but may be part of externalized symptomatological

expression of distress and negative affect especially in pre-adolescence years.[28] Thus, the significant rates of irritability in our patients may represent an "acting out" of depressed youths' manifestation rather than internalize emotionally devastating depressive symptoms.[28,29]

The literature shows high rates of suicidal behavior in depressed youths, and the most investigated forms are suicidal thoughts and suicide attempts.[30,31] However, different levels of suicidal cognition, such as recurrent thoughts of death and wishing to be dead have been also associated with an elevated risk for subsequent suicide attempts.[31] As our patients have reported a high rate of all types of suicidal cognition (e.g. thoughts of death; wishing to be dead; suicidal thoughts; and suicide planning), the present study supports the notion that suicidal behavior is actually common in depressed children and adolescents.[30,31] These findings suggest that clinicians must give closer attention to a variety of suicidal cognitions that may be predictive of a future suicidal attempt.[31]

The rates of psychotic symptoms in our sample are higher than similar outpatient sample studies.[2-4,32] The presence of some Schneiderian first-rank psychotic symptoms makes the diagnosis much more difficult in these patients, since they can be misdiagnosed as psychosis, schizophrenia, or bipolar disorder.[32]

The proportion of manic symptoms reported by our depressed youth was unusually higher compared to similar studies. Depressed children and adolescents presenting psychotic symptoms associated with manic symptoms suggest the possibility of high rates of switching from early onset depression to early onset mania.[3,33-35] One explanation for such a high rate is that our sample was comprised of severely depressed adolescents and children. Some of these patients may actually have bipolar depression,[3,33-35] but this hypothesis should be confirmed in a follow-up study.

Psychiatric concurrent comorbidities are common in the early onset of MDD,[1,15,36,37] typically ranging from 40 to 90%. Consistent with the literature, and as expected, the most common concurrent comorbidities found in our clinical sample are anxiety disorders and dysthymia.[6,15] Dysthymic comorbidity is related to the concept of double depression, which may result in more severe and longer depressive episodes.[36,38] These findings may explain in part the depression severity level of the entire sample. Previous studies also reported that there is an association between concurrence of depression with an anxiety disorder and increase in severity and duration of MDD and suicidal behavior.[6,15,37,39] Anxious children tend to be symptomatic at a younger age than depressed children. The connection between depression and anxiety disorders is so close that a high level of anxiety may be viewed as an efficient predictive signal for subsequent depression in childhood.[6,25,37,39] The severity of depression and functioning impairment observed in our sample may be partly attributable to the occurrence of comorbidities.[37,39-41]

The relationship of gender plus development to pediatric depression and other psychiatric comorbidities has not been also consistently explored.[24,37] One study has found similar rates of comorbid anxiety or behavior disorder among boys and girls, while another detected a temporal trend among depressed girls that manifests more eating disorder comorbidity and less disruptive behavior comorbidity.

Kovacs et al.[24,37] observed that girls presented a particular pattern of comorbid externalizing or behavior disorders (e.g. attention deficit, conduct, oppositional). The peak risk for these comorbid conditions is during girls' mid-adolescence. In contrast, depressed boys consistently present higher rates of externalizing problems throughout the years and they notably include, an increase of their use/abuse of substances in late-adolescence, which persists into their young adulthood.[24,37] Such trends suggest intriguing effects of development and gender on risk of comorbid psychiatric disorders among depressed girls versus boys.[24] Furthermore, developmental epidemiology studies have found that heterotypic continuity between comorbidities: a comorbid disorder with the likelihood of following a different disorder, is significantly more likely to manifest in girls than in boys.[15]

Consistent with other studies, our adolescents presented significantly more symptoms than children.[3,4,7,15] The higher frequency of numerous symptoms characterized as negative cognitions of hopelessness, worthlessness and self-denigration, and feeling of guilt suggests that depressive symptom expression is an age-dependent phenomenon, and apparently the differences are in evolving cognition and language development.[1,4,6,7,25]

It is generally believed that small children have a limited developmental ability, and therefore, do not experience specific symptoms of depression such as guilt, low self-esteem, and hopelessness. It is normally during adolescence, with the advent of abstract thinking, that individuals develop increasing concern for social issues and moral principles, which serve as a breeding ground for the development of depressive cognition about moral inadequacy and guilt.[1,5,7,17]

Marked differences emerged between children and adolescents, having the shared environment accounted for a significant proportion of the variation among younger children only.[6,40-43] Scourfielf et al. believe that genetic influences became increasingly important in adolescence, accounting for 66-80% of the variance.[41] Some early-maturing boys and female adolescents have been shown to experience more depressive symptoms and stressful life events. These findings illustrate the importance of the interaction between pubertal transition and psychosocial factors in adolescent vulnerability to the manifestation of MDD. Alternatively, to the extent that genes influence our behavior, and our behavior affects how we interact with the environment, genes and the environment may be correlated.[41] There is clearly a need to further examine what shared and non-shared environmental factors account for symptom continuity over time. Luby et al. have also demonstrated that early experiences of stressful life events mediated the relationship between family history of mood disorders and depression severity six months after the event occurred, in a preschool population.[42] Some symptoms presented by our female adolescent group were more frequent than those symptoms presented in male adolescents, and also more frequent than in children. These findings are consistent with prior findings in female adolescents who had more mood and cognitive symptoms, as well as more recurrence of depression and suicidal behavior than males.[2,3,24,25]

Researchers have suggested that female adolescents carry more risk factors for depression than males even before adolescence, but these risk factors lead to depression only in the presence of challenges that increase in adolescence.[8,11,24]

In addition to the hypothesis of cognitive ability development, researchers have proposed alternative possibilities. One of these alternatives is the *stress-sensitization model.*[25] This model emphasizes that a child with a previous history of adversity would require only mild stress to trigger depression when older, whereas a child without a history of adversity would require more severe stress to trigger depression. This stress sensitization model is consistent with one of the pioneering diathesis-stress perspectives, which suggested that individuals with a preexisting vulnerability to psychopathology might require lower levels of stress ~e.g., challenges encountered in daily life to trigger the onset of symptoms than those without a preexisting vulnerability.[25]

Rudolph and Flynn have suggested that the transition through puberty might be especially likely to activate what they named the *stress-sensitization processes*, which investigators have linked to depression in pos-pubertal girls. Research reveals that female adolescents are more sensitive than males to the adverse effects of stress, particularly stressors that involve the disruption of interpersonal relationships.[25] Such age and gender differences may have implications for treatment strategies, prevention purposes, and the search for causes of MDD.[8-10,18,43]

This study small sample size may lead to type I and type II errors, and probably prevented identifying more significant differences between children and adolescent subgroups. Realizing that this study investigated a small sample and as an in-depth statistical analysis during the investigation, our finding should be viewed as exploratory and preliminary, and further research with a larger sample may lead to different conclusions.

Since the subjects were recruited from a tertiary university-based outpatient service, more severe patients with multiple comorbidities were selected. Thus, the results of the present study, must be viewed as specific and not reflecting the Brazilian non-adult population.

This study added more phenomenological descriptions on depressed children and adolescent samples. The presence of comorbidity may indicate the severity of the early onset sample, displaying sizable psychotic symptoms and suicidal behaviors. However, the inquiry about whether MDD clinical presentation varies with age is far from resolved. The question as to whether these are merely age-dependent expressions of the same underlying construct, or expressions of a different etiology requires a far more representative sample and longitudinal investigation.

Acknowledgment

We would like to thank Dr Telma Pântano, B.A., PhD., Dr Maria Cecília Lopes-Conceição, MD., PhD., Ligia Claudia Votta, Sabrina Amaro Viana and Dr Ana Rosa Silveira Cavalcanti, M.D. for their support by conducting a structured Diagnostic Interview and data collection.

References

1. Weiss B, Garber J. Developmental differences in the phenomenology of depression. *Dev Psychopathol.* 2003;15(2):403-30.
2. Yorbik O, Birmaher B, Axelson D, Williamson DE, Ryan ND. Clinical characteristic of depressive symptoms in children and adolescents with major depression disorder. *J Clin Psychiatry.* 2004;65(12):1654-9.
3. Birmaher B, Williamson DE, Dahl RE, Axelson DA, Kaufman J, Dorn LD, Ryan ND. Clinical presentation and course of depression in youth: does onset in childhood differ from onset in adolescence? *J Am Acad Child Adolesc Psychiatry*. 2004;43(1):63-70.
4. Sorensen MJ, Nissen JB, Mors O, Thomsen PH. Age and gender differences in depressive symptomatology and comorbidity: an incident sample of psychiatrically admitted children. *J Affect Disord.* 2005;84(1):85-91.
5. Pine DS. Brain development and the onset of mood disorders. *Semin Clin Neuropsychiatry*. 2002;7(4):223-33.
6. Kolvin I, Sadowski H. Childhood depression: clinical phenomenology and classification. In: Goodyer IM, editor. *The depressed child and adolescent.* 2th ed. Cambridge University Press; 2001. p. 119-42.
7. Miller A. Social neuroscience of child and adolescent depression. *Brain Cogn*. 2007;65(1):47-68.
8. Bennett DS, Ambrosini PJ, Kudes D, Metz C, Rabinovich H. Gender differences in adolescent depression: do symptoms differ for boys and girls? *J Affect Disord.* 2005;89(1-3):35-44.
9. Li CE, DiGiuseppe R, Froh J. The role of sex, gender and coping in adolescent depression. *Adolescence.* 2006;41(163):409-15.
10. Cyranowski JM, Frank E, Young E, Shear MK. Adolescent onset of the gender difference in lifetime rates of major depression: a theoretical model. *Arch Gen Psychiatry.* 2000;57(1):21-7.
11. Abela JR, Véronneau-McArdle MH. The relationship between self-complexity and depressive symptoms in third and seventh grade children: a short-term longitudinal stud. *J Abnorm Child Psychol.* 2002;30(2):155-66.
12. Rice F, Harold GT, Shelton KH, Thapar A. Family conflict interacts with genetic liability in predicting childhood and adolescent depression. *J Am Acad Child Adolesc Psychiatry.* 2006;45(7):814-48.
13. Wilkinson PO, Goodyer IM. Attention difficulties and mood-related ruminative response style in adolescents with unipolar depression. *J Child Psychol Psychiatry.* 2006;47(12):1284-91.
14. Sourander A, Multimäki P, Nikolakaros G, Haavisto A, Ristkari T, Helenius H, Parkkola K, Piha J, Tamminen T, Moilanen I, Kumpulainen K, Almqvist F. Childhood predictors of psychiatric disorders among boys: a prospective community-based follow-up study from age 8 years to early adulthood. *J Am Acad Child Adolesc Psychiatry.* 2005;44(8):756-67.
15. Costello EJ, Foley DL, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: II. Developmental epidemiology. *J Am Acad Child Adolesc Psychiatry.* 2006;45(1):8-25.
16. Keenan-Miller D, Hammen CL, Brennan PA. Health outcomes related to early adolescent depression. *J Adolesc Health*. 2007;41(3):256-62.
17. Angold A, Costello EJ. The epidemiology of depression in children and adolescents. In: Goodyer IM, editor. *The depressed child and adolescent.* 2th ed. Cambridge University Press; 2001. p. 143-78.
18. Horowitz JL, Garber J. The prevention of depressive symptoms in children and adolescents: a meta-analytic review. *J Con Clin Psychol.* 2006;74(3):401-15.
19. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). Washington, DC: American Psychiatric Association, 1994.
20. World Health Organization. World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP). Guidelines for research on reproductive health involving adolescents. From the Programme's document Preparing a Project Proposal, Guidelines and Forms (3th Edition) 2003. Available at: www.who.int/reproductivehealth/hrp/guidelinesadolescent.en.html.
21. Reich W, Welner Z, Herjanic B. *Diagnostic Interview For Children and Adolescents – Revised: Manual.* New York: Multi-Health Systems Inc; 1995.
22. Poznanski EO, Mokros HB. Psychometric properties of the CDRS-R. In: Mokros HB, Poznanski EO, editors. *Children's Depression Rating Scale, Revised (CDRS-R).* Los Angeles, CA: Western Psychological Services; 2005. p. 52-3.
23. Shaffer D, Gould M S, Brasic J, Ambrosini P, Fisher P, Bird H, Aluwahlia S. A Children's Global Assessment Scale (CGAS). *Arch Gen Psychiatry.* 1983;40(11):1228-31.
24. Kovacs M, Obrosky DS, Sherrill J. Developmental changes in the phenomenology of depression in girls compared to boys from childhood onward. *J Affect Disord.* 2003;74(1):33-48.
25. Rudolph KD, Flynn M. Childhood adversity and youth depression: Influence of gender and pubertal status. *Dev Psychopathol.* 2007;19(2):497-521.
26. Luby JL, Mrakotsky C, Heffelfinger A, Brown K, Spitznagel E. Characteristics of depressed preschoolers with and without anhedonia: evidence for a melancholic depressive subtype in young children. *Am J Psychiatry.* 2004;161(11):1998-2004.
27. Masi G, Millepiedi S, Mucci M, Pascale RR, Perugi G, Akiskal HS. Phenomenology and comorbidity of dysthymic disorder in 100 consecutively referred children and adolescents: beyond DSM-IV. *Can J Psychiatry.* 2003;48(2):99-105.
28. Borchardt CM, Meller WH. Symptoms of affective disorder in pre-adolescent vs. adolescent inpatients. *J Adolesc.* 1996;19(2):15561.
29. Kovacs M, Paulauskas S. Developmental stage and the expression of depressive disorders in children: an empirical analysis. In: Cicchetti D, Schneider-Rosen K, editors. *Childhood depression new directions for child development*. San Francisco: Jossey-Bass; 1984.
30. Barbe RP, Williamson DE, Bridge JA, Birmaher B, Dahl RE,

Axelson DA, Ryan ND. Clinical differences between suicidal and nonsuicidal depressed children and adolescents. *J Clin Psychiatry.* 2005;66(4):492-8.

31. Liu X, Gentzler AL, Tepper P, Kiss E, Kothencné VO, Tamás Z, Vetró A, Kovacs M. Clinical features for depressed children and adolescents with various forms of suicidality. *J Clin Psychiatry.* 2006;67(9):1442-50.
32. Ulloa RE, Birmaher B, Axelson D, Williamson DE, Brent DA, Ryan ND, Bridge J, Baugher M. Psychosis in a pediatric mood and anxiety disorders clinic: phenomenology and correlates. *J Am Acad Child Adolesc Psychiatry.* 2000;39(3):337-45.
33. Geller B, Zimerman B, Williams M, Bolhofner K, Craney JL. Bipolar disorder at prospective follow-up of adults who had prepubertal major depressive disorder. *Am J Psychiatry*. 2001;158(1):125-7.
34. DelBello MP, Carlson GA, Tohen M, Bromet EJ, Schwiers M, Strakowski SM. Rates and predictors of developing a manic or hypomanic episode 1 to 2 years following a first hospitalization for major depression with psychotic. *J Child Adolescent Psychopharmacol.* 2003;13(2):173-85.
35. Akiskal HS. Developmental pathways to bipolarity: are juvenile-onset depressions pre-bipolar? *J Am Acad Child Adolesc Psychiatry.* 1995;34(6):754-63.
36. Kovacs M, Obrosky S, Gatsonis C, Richards C. First-episode major depressive and dysthimic disorder in childhood clinical and sociodemographic factors in recovery. *J Am Acad Child Adolesc Psychiatry.* 1997;36(6):777-84.
37. Kovacs M, Gatsonis C, Paulauskas SL, Richards C. Depressive disorder in childhood IV: A longitudinal study of comorbidity with and risk for anxiety disorders. *Arch Gen Psychiatry.* 1989;46(9):776-82.
38. González-Tejera G, Canino G, Ramírez R, Chávez L, Shrout P, Bird H, Bravo M, Martínez-Taboas A, Ribera J, Bauermeister J. Examining minor and major depression in adolescents. *J Child Psychol Psychiatry.* 2005;46(8):888-99.
39. Weissman MM, Wolk S, Wickramaratne P, Goldstein RB, Adams P, Greenwald S, Ryan ND, Dahl RE, Steinberg D. Children with prepubertal-onset major depressive disorder and anxiety grown up. *Arch Gen Psychiatry*. 1999;56(9):794-801.
40. McClure EB, Parrish JM, Nelson EE, Easter J, Thorne JF, Rilling JK, Ernst M, Pine DS. Responses to conflict and cooperation in adolescents with anxiety and mood disorders. *J Abnorm Child Psychol.* 2007;35(4):567-77.
41. Scourfield J, Rice F, Thapar A, Harold GT, Martin N, McGuffin P. Depressive symptoms in children and adolescents: changing aetiological influences with development. *J Child Psychol Psychiatry.* 2003;44(7):968-76.
42. Luby JL, Belden AC, Spitznagel E. Risk factors for preschool depression: the mediating role of early stressful life events. *J Child Psycho Psychiatry.* 2006;47(12):1292-8.
43. Weisz JR, McCarty CA, Valeri SM. Effects of psychotherapy for depression in children and adolescents: a meta-analysis. *Psychol Bull.* 2006;132(1):132-49.