

# Psychotropic Medication Use in Children and Adolescents: Review of Outpatient Treatments

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## ABSTRACT

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**Objective:** In the literature, children and families have been reported to show high rates of non-adherence to psychopharmacological treatment. This study aimed to investigate psychotropic drug selection, repeat prescription rates, and drug compliance in children who presented to the psychiatry department of a university hospital.

**Method:** Patients examined at the Ondokuz Mayıs University Child Psychiatry Outpatient Clinic were included in the study. Patients were retrospectively screened with the Nucleus® system.

**Results:** 12607 patients were included the study, 8889 of whom (70.4%) had received at least one prescription during the follow-up. The mean age of the patients was 12.1±5.0 years and the male sex ratio was 57.4%. The highest-prescribed drug groups were antipsychotics (32.7%) and stimulants (32.5%). A total of 38432 psychotropic drug prescriptions were made. Patients using psychotropic drugs were given prescriptions 4.32 times on average during this time period, while 2356 patients (26.2%) received one prescription.

**Conclusions:** Over the time period of the study, one out of every four patients who used psychotropic medication only received one prescription. Many of the psychotropic drugs used in children and adolescents are part of long-term treatments, and we observed a high rate of non-adherence to psychopharmacological treatment in children and families. For future research, we recommend to include factors affecting treatment adherence in children and families.

**Keywords:** Adolescent, child, outpatient treatment, psychotropic medication

## ÖZ

Çocuk ve ergenlerde psikotrop ilaç kullanımı: Poliklinik tedavilerinin gözden geçirilmesi

**Amaç:** Literatürde, çocuk ve ailelerin yüksek oranlarda psikofarmakolojik tedaviye uyumsuzluk gösterdiği bildirilmiştir. Bu çalışmada bir üniversite hastanesi psikiyatri bölümüne başvuran çocuklarda psikotrop kullanım sıklığının saptanması, tekrar reçetelenme oranları ile tedavi uyumunun araştırılması amaçlanmıştır.

**Yöntem:** Ondokuz Mayıs Üniversitesi Çocuk Psikiyatri Polikliniğinde muayene edilen hastalar çalışmaya dahil edilmiştir. Hastalar retrospektif olarak Nucleus® poliklinik sistemi ile taranmıştır.

**Bulgular:** Üç yıllık zaman periyodunda 12607 kayıtlı hastaya ulaşılmıştır. Hastaların yaş ortalaması 12.1±5.0 ve erkek cinsiyet oranı %57.4'tü. En yüksek oranda reçetelenen ilaç grubu %32.7 ile antipsikotikler ve %32.5 ile stimulan ilaçlar olduğu tespit edilmiştir. Poliklinik kontrolleri sırasında 8.889 hasta (%70.4) en az bir kez reçetelendirilmiştir ve toplam 38432 adet psikotrop ilaç reçete edilmiştir. Psikotrop kullanan hastalar çalışma zaman periyodunda ortalama 4.32 kez reçetelendirilmiştir ve 2356 hasta (%26.2) bir kere reçetelendirilmiştir.

**Tartışma:** Çalışmanın zaman aralığında, psikotrop ilaç kullanan her dört hastadan biri sadece bir kez reçetelendirilmiştir. Psikotrop ilaçların bir çoğu uzun süreli tedavilerin parçasıdır ve çalışmamızdaki veriler ile hastaların yüksek oranda tedaviye devam etmediği gözlenmiştir. Çocuk, ergenler ve ailelerinde ilaç uyumunu etkileyen faktörlere ait çalışmalara ihtiyaç duyulmaktadır.

**Anahtar kelimeler:** Ergen, çocuk, poliklinik tedavileri, psikotrop ilaç



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## INTRODUCTION

All over the world, we have seen an increase in the use of psychotropic drugs for the treatment of children in the last years (1,2); children and adolescents presenting at psychiatric policlinics are more frequently started on psychotropic drug treatment (3). According to data for the year 2013, antidepressant use in Turkey had increased by 50% and antipsychotic use by 47.6% compared to 2007, while the number of prescriptions had risen by 5.8% since the previous year (4). Two studies made with children and adolescents in Turkey in 1992 and 2005 found that a share of 23.4 and 24%, respectively, were started on a psychotropic drug (5,6), while a study in 2012 with cases from a child and adolescent policlinic reported that 57.4% had been started on a psychotropic drug (7).

In England, too, child and adolescent psychiatrists report that stimulants and atypical antipsychotics are the most commonly used drugs in that population (8). From the US, an increase in the prescription of antipsychotics has also been reported, with 18.3% of child psychiatry consultations resulting in the prescription of antipsychotics (9). According to data from a study in Turkey made in 2012 in one child and adolescent psychiatry clinic, the list of the most frequently prescribed drug groups was led by selective serotonin reuptake inhibitors (SSRIs) (7). Despite the fact that there is little evidence regarding the long-term safety and effectiveness of antipsychotic use in children and adolescents, many hospitals are prescribing these drugs, and there are only few studies examining the prescription ratio in Turkey (7). There is a widening debate about the issue of psychotropic drug use in children and adolescents worldwide (10), while in Turkey, despite a growing young population (11), there are few studies dealing with this topic.

The literature informs us that it is hard to keep children and adolescent patients and their family in therapy (12,13), with a high rate of non-compliance in psychopharmacologic treatment (13,14). A study carried out with 9549 children and adolescents in the United States of America (USA) reported that 10 months after start of therapy, 43% of patients were

continuing the use of the recommended psychotropic drug (15). The most common reason for unsuccessful treatment was non-compliance with the medication (16). Investigating non-compliance is an important research topic given the serious material losses to the patient and to national economy (17).

Various methods to study drug compliance have been described in the literature. One of these is the medication possession ratio, found by dividing the number of days with drug use by the number of days between the first and last day of prescription (15). In our study, we also looked at the number of drug refills in the determined period in order to assess the adherence for different drug groups.

Our study aimed to establish the choice and frequency of use of psychotropic drugs, repeated prescriptions of psychotropic drugs, and non-compliance rates in patients presenting at the child and adolescent psychiatry department of an university hospital.

## METHOD

Outpatients from the Child and Adolescent Mental Health and Disease Policlinic of Ondokuz Mayıs University (OMU) between January 1<sup>st</sup>, 2013 and December 1<sup>st</sup>, 2015 were enrolled retrospectively into the study. Data about patients' sex, age, prescribed drug, and number of prescriptions were retrieved from the Nucleus<sup>®</sup> policlinic system. The study was approved by the OMU Clinical Research Ethics Committee under the number B30.2.ODM.0.20.08/41. Data were analyzed using SSPS v. 15.0. Psychotropic drugs were analyzed in groups according to their active substance. The descriptive data are presented in tables 1-3 as percentage and mean and standard deviation.

## RESULTS

The study accessed data for 12607 patients. Mean age of the patients was 12.1 years and 57.2% were male. At least one prescription during the policlinic consultation was given to 8889 patients (70.4%), who were receiving a total of 38432 psychotropic drug

prescriptions. During this period, patients on psychotropic drugs were given repeated prescriptions 4.32 times on average; a single repeated prescription was given to 2356 patients (26.2%). The average number of psychiatric consultations was 3.12. The

most frequently prescribed drugs were osmotic release oral system methylphenidate (OROS Methylphenidate) (26.0%) and risperidone (23.1%). Of the SSRI group, sertraline (7.4%) and fluoxetine (6.9%) were the most prescribed ones. The least prescribed drugs were

**Table 1: Data on prescription of psychotropic drugs**

	Total number of prescriptions (n=38432)	Percentage of total number of prescriptions (%)	Percentage within group (%)	Number of repeated prescriptions (Mean)
<b>Stimulant and non-stimulant ADHD group</b>	18085	47.00	-	-
OROS Methylphenidate	10027	26.00	55.40	5.71
Atomoxetine	5548	14.40	30.60	4.12
IR Methylphenidate	2510	6.50	13.80	2.13
<b>Antipsychotic group</b>	12589	32.70	-	-
Risperidone	8880	23.10	70.50	2.84
Aripiprazole	2420	6.20	19.20	2.75
Quetiapine	963	2.50	7.60	2.34
Chlorpromazine	178	0.40	1.40	2.18
Olanzapine	98	0.20	0.70	2.21
Haloperidol	33	0.08	0.20	1.92
Pimozide	9	0.02	0.07	1.80
Clozapine	8	0.02	0.06	2.00
<b>Antidepressant group</b>	5829	14.80	-	-
Sertraline	2860	7.40	49.10	2.64
Fluoxetine	2689	6.90	46.20	3.16
Mirtazapine	135	0.30	2.30	1.75
Escitalopram	66	0.10	1.10	1.58
Venlafaxine	48	0.10	0.80	1.55
Paroxetine	19	0.03	0.30	1.78
Citalopram	12	0.02	0.20	1.50
<b>Anxiolytic group</b>	277	0.60	-	-
Lorazepam	171	0.40	61.70	0.46
Alprazolam	74	0.10	26.70	0.08
Clonazepam	21	0.04	7.50	0.10
Diazepam	11	0.02	3.90	0.12
<b>Mood stabilizer group</b>	599	1.50	-	-
Valproic Acid	480	1.20	80.10	4.22
Lithium	42	0.10	7.00	2.10
Lamotrigine	34	0.08	5.60	1.71
Carbamazepine	25	0.06	4.10	1.43
Topiramate	18	0.04	3.00	1.12

ADHD: Attention deficit hyperactivity disorder, OROS: Osmotic release oral system, IR: Immediate release

**Table 2: Data on outpatient clinic prescriptions for the 0-6 years old group**

<b>Total number of patients</b>	1312
Sex (%)	62.8 male - 37.2 female
Mean number of psychiatric interviews	3.12
<b>Total number of prescriptions</b>	1020
Number of patients receiving prescription	410
Percentage of prescription (%)	30.1
Number of patients receiving a single prescription	203
Percentage of patients receiving a single prescription among total number of patients receiving a prescription (%)	49.5

Evaluation period was between 01.01.2013 and 01.12.2015.

clozapine (0.02%) and antipsychotics in injectable form (0.01%). During the study period, the drugs with the most frequent repeat prescription (on average 5.71 times) were OROS methylphenidates. Patients received repeat prescriptions for valproic acid 4.22 times, for atomoxetine 4.12 times, fluoxetine 3.16, risperidone 2.84, aripiprazole 2.75, sertraline 2.64, and for immediate release methylphenidate (IR Methylphenidate) 2.13 times. Table 1 shows the drug groups, percentage of total prescription number and repeat prescription numbers.

For the 0-6 years old group, there were a total of 1312 patient records. From this group, 410 (30.1%) had received 1020 drug prescription for various conditions, the most commonly prescribed drugs being risperidone as oral solution (63.2%), fluoxetine as oral solution (10.7%), and short-acting methylphenidate (10.4%). In this group, 203 patients (49.5%) received one repeat prescription. Table 2 shows the data for the 0-6 years old group.

## DISCUSSION

For the 3-year period covered in this study, we accessed data for 12607 patients and 38432 prescriptions. The average age of the patients was  $12.1 \pm 5.2$  years, mean number of psychiatric consultations was 3.12, and 70.4% of the patients were prescribed a psychotropic drug. Other studies carried out in Turkey in different years reported that 23.4%, 24.1%, and 57.4% of patients, respectively, had been prescribed psychotropic drugs (5-7). It has been reported that the current use of psychotropics in the USA increased fourfold compared to the 1990s (18); a study made with child and adolescent outpatients in the USA in 2005 found that 74% of the patients were prescribed psychotropic drugs (19). Over the years, the use of psychotropic drugs in children and adolescents has shown an increase. The most important reasons for this increase may be seen in the growing number of clinical studies on psychotropic drugs, the increase of evidence-based therapy guidelines for children and adolescents, and an easier access to doctors for the patients (20).

In our study, the most frequently prescribed drugs were attention deficit hyperactivity disorder (ADHD) medicines, and the highest number of repeat prescriptions with 5.71 times was for OROS methylphenidates. ADHD is one of the most commonly seen disorders in child and adolescent psychiatry (21), and big randomized controlled trials have demonstrated that stimulants have positive effects in this condition (22). Patients for whose ADHD treatment OROS methylphenidate was recommended (54.4%) were more often brought in for polyclinic control and received more repeat prescriptions, which may suggest that the patients' therapy compliance in the methylphenidate group was higher than for other drug groups. The fact that OROS methylphenidate affects the symptoms more rapidly than other psychotropic drugs and reaches a higher degree of symptom control may lead to an increase in compliance (23). With a share of 14%, atomoxetine, a different agent used in ADHD treatment, was the third-most prescribed drug. Atomoxetine has been shown to be effective in ADHD therapy (24) and comes among the first psychotropic drugs recommended in therapy guidelines (25).

There are only few data for drug use in preschool patients in the literature. An epidemiological study made in the USA in 2003 found that 16% of preschool children with emotional and behavioral problems were prescribed psychotropic drugs (28). A study from Turkey carried out in 2015 with 2790 children between the ages of 0 and 6 years reported that 18.5% of cases were prescribed risperidone (29). In our study, risperidone was the most prescribed drug in the preschool group with 63.2%. Risperidone is an antipsychotic frequently chosen in child and adolescent practice, and its use is becoming increasingly common (30). According to data from the USA, the rate of risperidone use between 2004 and 2008 increased by 11.3% in 3-6-year-olds and by 17.1% in 7-12-year-olds (31); it was the most selected antipsychotic for the preschool period (32). In this age group, risperidone was given with 1.24 repeat prescriptions for the duration of the study (35 months), which, considering the therapy process for developmental diseases, appears to be a low number.

Doctors' interventions through environmental factors (behavioral regulation, attitude recommendations for parents, etc.) often quickly improving symptoms, concerns about side effects of long-term use (33), non-compliance (13), or the fact that low-dose solutions such as risperidone cannot be used long may be among the reasons for the short period of use and the decision not to re-prescribe the drug (34).

During the study period, one quarter of the patients using a psychotropic drug only received one prescription. Many of the psychotropic drugs used in children and adolescents are part of a long-term therapy (18). Therefore, we may suspect that the children and adolescents in our study and their families did not implement the suggested use of psychotropic drugs, creating an adherence problem. Therapy compliance is a controversial concept. The related term "therapeutic alliance," an accepted concept today, defines the included aspect of compliance as "the extent to which a person's behaviour (taking medications, following a recommended diet or executing life-style changes) coincides with medical or health advice" (35). These initial data indicate problems relating to children and adolescents' compliance with psychopharmacological treatment. Reasons for non-compliance may have to do with the drug, the patient, or social and environmental factors (13). Among the most reported causes are drug costs, doctor-patient relationship, and side effects (36).

The main limitation of this study is that only patient records of the university hospital where the study was carried out have been assessed and patients continuing their treatment in a different hospital could not be

evaluated. This may have resulted in patients' compliance and repeated prescription rates looking lower than they actually were. Furthermore, generalizability is limited for data from a single-center study. Another limitation is the fact that the number of drug packages prescribed in a single psychiatric consultation has not been entered into the calculation. Prescription of more than one package of a psychotropic drug at a time may have led to a lower number of repeat prescriptions reflecting upon the non-compliance data in or study.

Our study found a high level of non-compliance with psychopharmacological treatment and a low rate of repeat prescription. In order to increase compliance for future clinical interventions in child and adolescent psychiatry, we need compliance studies taking into account factors specific to the patient, the physician, and the region.

Contributions category	Authors name
Development of study idea	M.B.U., Y.Y.G., K.K., A.A., G.N.S.
Methodological design of the study	M.B.U., Y.Y.G., K.K., A.A., G.N.S.
Data acquisition and process	M.B.U., A.A., Y.Y.G.
Data analysis and interpretation	M.B.U., A.A., Y.Y.G.
Literature review	M.B.U., A.A., Y.Y.G.
Manuscript writing	M.B.U., A.A., Y.Y.G.
Manuscript review and revision	Y.Y.G., K.K., A.A., G.N.S.

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