
Psychotropic Medication Use in Children and Adolescents with Mental Retardation (MR)

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Abstract: Background: The aim of this study was to assess the medication use in children and adolescents with mental retardation (MR) retrospectively in a cross-sectional study. Method: Between June and December 2013, records of the children and adolescents admitted by our polyclinic were retrospectively evaluated and those who had MR diagnosis were analyzed. Results: Male sex was found as statistically related to the presence of psychiatric comorbidity and the pervasive developmental disorders (PDD). At least one medical diagnosis accompanying with MR was found in 49.7% (n=781) of all patients. 79.6% (n=1252) of all patients did not use any medication, 16.7% (n=262) of all sample were using one medication agent, 3.5% (n=55) of patients were using combined pharmacotherapy. The predictors of psychotropic medication were the following: the presence of comorbid any of psychiatric disorders, having attention deficit hyperactivity disorder (ADHD), having conduct disorders (CD) and having anxiety disorders. Conclusions and Recommendations: This study has a descriptive nature of the children with MR admitted to the child psychiatry department. It was noticed that psychotropic agent use is preferable if there is a comorbid situation in mental retardation. There is a need for further studies with prospectively planned, multi-central with larger sampling in our country to draw up a way of health policies related to the children with MR.

Keywords: Mental Retardation, Children, Adolescent, Psychotrop Use, Comorbidity

1. Introduction

The description of mental retardation (MR) defined by American Association on Mental Retardation in 2002 is 'the disability which is characterized by severe limitedness in mental functionality, consequent behaviors and cognitive, social and adaptive skills'. This disability begins before the age of 18, and shows itself with issues arising from the functioning of the individual [1]. In the literature, it is seen that the prevalence varies round 1-3% according to the sample characteristics, the diagnostic criteria used and the sampling method included [2].

MR is a lifelong and chronic impairment which has medical, social, educational and economic problematic areas. The combination of mental and physical disorders associated with mental retardation is higher than that of the community sample [3]. On the other hand, overlooking of both mental and physical disorders in this group are often experienced. It is emphasized that psychiatric evaluation in patients with MR

takes more time than a person's assessment who has a normal cognitive level, and not only focus on the treatment of disruptive behavior and also need a holistic approach [4]. Early diagnosis and appropriate treatment are very important on increasing patients' functionality and quality of life.

The present study aims to examine the demographic characteristics, the admission complaints, the level of MR, comorbid disorders accompanying with, the prevalence of psychotropic medication use, the medications used and the predictors of psychotropic medication in children and adolescents aged 6-18 years and diagnosed with mental retardation by Child Psychiatry of Ankara Pediatric Hematology Oncology Training and Research Hospital.

2. Method

Sampling

In this study, hospital records of outpatient cases who admitted Child Psychiatry of Ankara Pediatric Hematology Oncology Training and Research Hospital in the six-month

period, between June 2013 and December 2013, were screened retrospectively. Detected cases with mental retardation aged 6-18 years were evaluated in detail. In this evaluation, the demographic characteristics, the level of mental retardation, the first application complaints, the psychiatric and medical history of the patients, the presence of comorbidity and drug use variables were examined. Psychiatric diagnoses are classified according to DSM-IV-TR⁵. For measuring the intellectual quotient (IQ), Weschler Intelligence Scale for Children-Revised (WISC-R) and Stanford Binet Intelligence Scale were used. Thus, MR subtypes was defined according to the full scale IQ score as the following; IQ=50-69 as mild MR; IQ=36-49 as moderate MR; unknown but presumed IQ score <70 as severity unspecified MR; IQ=21-35 as severe MR, and IQ score ≤20 as profound MR.

Statistical analysis: In the evaluation of data SPSS for Windows of 17.0 (Statistical Package for Social Sciences, Version 17.0, Chicago: SPSS Inc., 2008) statistical software package was used. Categorical variables were analyzed with chi-square (X^2) test. Interval variables were analyzed with t-test. The predictors of psychotropic medication use were analyzed with logistic regression analysis. In all evaluations $p < 0.05$ value was considered statistically significant.

3. Results

The number of outpatient applications to the Child Psychiatry of Ankara and Child Health and Medicine Hematology Oncology Training and Research Hospital in June-December 2013 was determined as total 12,320. The number of outpatients with MR in our sample was 1,572 (12.8%).

The mean age of cases ($n=1,572$) were 11.3 ± 3.3 (range 6-18 years). The sample was divided into two groups according to the age as children (6-11 years of age) and adolescents (12-18 years of age). Thus, 50.8% of the sample was formed by children age group ($n=798$), and adolescents (49.2%, $n=774$). Mean age of females and males were similar in terms of gender ($t(1570) = -1.845$, $p > 0.05$). Similarly, no any significant difference was detected between the children and adolescents in gender terms. Males consisted of 60% of all subjects ($n=943$). Male/female ratio was almost 1.5 (M/F=1.49). Classification of MR subtypes was the following; more than half of the whole sample (57.3%) had mild MR, 15.5% of all had moderate MR, 14.8% of all had severity unspecified MR, 12.2% of all had severe MR, and 0.3% of all had profound MR. Evaluating of the patients' complaints revealed that the most common cause of the application was the school failure (37.7%). The others were the following; renewal of special education report, aggressive and/or violent behavior, speech delay or retardation, hyperactivity and/or attention deficit, objections to the special education reports arranged before, avoidant and/or anxious behavior and other reasons. In this sample, 26.1% of all MR ($n=410$) was the newly diagnosed cases of MR. In 3.1% of the sample ($n=48$) was detected to be

changed the diagnosis of mental retardation as "borderline intellectual functioning (IQ=70-79) plus specific learning difficulties" (Table 1).

Table 1. The demographic and clinical features of children and adolescents with MR ($n=1572$).

Demographic features		
Age	(mean \pm SD) (years)	11.3 \pm 3.3
Females age (years)		11.5 \pm 3.3*
Males age (years)		11.2 \pm 3.3
Age groups	n (%)	
Children (6-11 years of age)		798 (50.8)
Adolescents (12 years and above)		774 (49.2)
Gender	n (%)	
Male		943 (60.0)
Female		629 (40.0)
MR subtypes	n (%)	
Mild MR (IQ=50-69)		900 (57.3)
Moderate MR (IQ=36-49)		244 (15.5)
Severity unspecified-MR (presumed IQ<70)		232 (14.8)
Severe MR (IQ=21-35)		191 (12.2)
Profound MR (IQ≤20)		5 (0.3)
Admission complaints	n (%)	
School failure		593 (37.7)
Renewal of special education report		592 (37.7)
Aggressive and/or violent behavior		137 (8.7)
Speech delay or retardation		118 (7.5)
Hyperactivity and/or attention deficit		76 (4.8)
Objections to the special education reports		34 (2.2)
Avoidant and/or anxious behavior		12 (0.8)
Other reasons		10 (0.6)
MR features	n (%)	
Already had MR diagnosis		1114 (70.9)
Newly first diagnosed		410 (26.1)
Switched from MR to BIF plus SLD		48 (3.1)

*There was a significance between sexes in terms of age ($t=-1.848$, $df=1570$, $p=0.065$). SD: Standard deviation, MR: Mental retardation, BIF: Borderline intellectual functioning (IQ=70-79), SLD: Specific learning disorder

At least one psychiatric comorbidity was detected in 24.6% of all sample and mostly found ones were disruptive behavior disorders (DBD; including conduct disorder (CD), attention deficit hyperactivity disorder (ADHD), and CD plus ADHD; 14.2%). The others were pervasive developmental disorders (PDD), anxiety disorders, elimination disorders, mood disorders and tic disorders. Non-psychiatric comorbidities accompanying with MR were found as 49.7% of all sample. Amongst these the most frequently identified one was epilepsy (21.9%), followed by cerebral palsy (CP) and speech and/or hearing impairment, respectively.

Evaluating of the relationship between MR levels and epilepsy showed that epilepsy presence in all five MR subtypes was found as significant ($X^2=227.845$, $p < 0.001$), prominently with profound MR (80%) and severe MR (61.3%). Having epilepsy in profound and/or severe MR cases was significantly higher that of the other MR patients ($X^2=206.937$, $p < 0.001$). The relationship between MR level and CP were also evaluated, revealing that CP prominently accompanied to 80% of profound MR, and 60.2% of severe

MR. It was also detected that profound and/or severe MR cases having CP comorbidity significantly more than that of the other MR patients ($X^2=278.320, p<0.001$).

When the relationship between MR levels and speech and/or hearing impairment comorbidity were evaluated, it was identified that speech and/or hearing impairment accompanied mostly to 12.5% of severity unspecified MR and 10.6% of whose mild MR. It was determined that having speech and/or hearing impairment comorbidity in mild MR, moderate MR and unspecified MR, in favor of unspecified MR (12.5%), significantly more than that of profound and/or severe MR cases ($X^2=14.117, p<0.001$) (Table 2).

Table 2. Physical and mental comorbid disorders in children and adolescents with MR (n=1572).

Psychiatric comorbidity	n (%)	p
None	1185 (75.4)	
Yes	387 (24.6)	
Comorbidities found	n (%)	
DBD	223 (14.2)	
CD	103 (6.6)	
ADHD	91 (5.8)	
ADHD plus CD	29 (1.8)	
Medical disorders	n (%)	
None	791 (50.3)	
Yes	781 (49.7)	
Disorders found	n (%)	
Epilepsy	345 (21.9)	$X^2=227.845, p<0.001$
CP	282 (17.9)	$X^2=319.189, p<0.001$
Speech and/or hearing impairment	147 (9.4)	$X^2=17.340, p=0.002$
Epilepsy in ID subtypes	n (%)	
Profound MR (n=5)	4 (80.0)	
Severe MR (n=191)	117 (61.3)	
Moderate MR (n=244)	61 (25.0)	
Severity unspecified-MR (n=232)	48 (20.7)	
Mild MR (n=900)	115 (12.8)	
Epilepsy in MR severity	n (%)	
Profound and/or severe MR (n=196)	121 (61.7)	$X^2=206.937, p<0.001$
The other MR subtypes (n=1376)	224 (16.3)	
CP in MR subtypes		
Profound MR (n=5)	4 (80.0)	
Severe MR (n=191)	115 (60.2)	
Moderate MR (n=244)	63 (25.8)	
Severity unspecified-MR (n=232)	23 (9.9)	
Mild MR (n=900)	77 (8.6)	
CP in MR severity		
Profound and/or severe MR (n=196)	119 (60.7)	$X^2=278.320,$

Table 3. Medication use, psychiatric comorbidity and epilepsy presence in terms of gender in children with MR (n=1572).

Variables	Male (n=943) n (%)	Female (n=629) n (%)	p
Medication use (n=320)	206 (64.4)	114 (35.6)	0.073 ($X^2=3.223$)
Psychiatric comorbidity (n=387)	255 (65.9)	132 (34.1)	0.006 ($X^2=7.456$)
Having ADHD (n=120)	82 (68.3)	38 (31.7)	0.052 ($X^2=3.770$)
Having CD (n=132)	84 (63.6)	48 (36.4)	0.371 ($X^2=0.799$)
Having anxiety disorders (n=51)	25 (49.0)	26 (51.0)	0.104 ($X^2=2.642$)
Having PDD (n=96)	76 (79.2)	20 (20.8)	<0.001 ($X^2=15.669$)
Epilepsy (n=345)	197 (57.1)	148 (42.9)	0.216 ($X^2=1.534$)

MR: Mental retardation, ADHD: Attention deficit hyperactivity disorder, CD: Conduct disorder, PDD: Pervasive developmental disorders

Psychiatric comorbidity	n (%)	p
The other MR subtypes (n=1376)	163 (11.8)	$p<0.001$
Speech/hearing impairment in MR		
Profound MR (n=5)	0 (0.0)	
Severe MR (n=191)	4 (2.1)	
Moderate MR (n=244)	19 (7.8)	
Severity unspecified-MR (n=232)	29 (12.5)	
Mild MR (n=900)	95 (10.6)	
Speech/hearing impairment in MR severity		
Profound and/or severe MR (n=196)	4 (2.0)	$X^2=14.117, p<0.001$
The other MR subtypes (n=1376)	143 (10.4)	

DBD: Disruptive behaviour disorders, MR: Mental retardation, ADHD: Attention deficit hyperactivity disorder, CD: Conduct disorder, CP: Cerebral palsy.

Evaluation of the clinical features of the MR cases in terms of gender revealed that having any of psychiatric disorders and having pervasive developmental disorder were significantly higher in males than that of females ($X^2=7456, p=0.006; X^2=15.669, p<0.001$, respectively) (Table 3).

Psychotropic medication used in children and adolescents with MR showed that 79.6% of the sample (n=1252) have had no any of psychotropic medications, whilst 20.4% of all have been using at least one psychotropic drug. From these, 16.7% (n=262) of cases was using one psychotropic drug and 3.7% (n=58) was using combined pharmacotherapy. When assessing the distribution of psychotropic medication use, it was observed that the most commonly used psychotropic drug was "antipsychotics" (14.2%, n=219), with the most frequently used agent of them as risperidone (11.5%, n=180). Second commonly used agents was for ADHD treatments (5.6%, n=89), including methylphenidate (MPH; 4.6%, n=72), atomoxetine (ATX; 1.0%, n=17). Third preferred agents were selective serotonin reuptake inhibitors (SSRIs; 3.8%, n=57), with fluoxetine was the mostly preferred molecule (3.4%, n=52).

Analysis of the predictors of psychotropic medication use revealed that comorbid psychiatric disorders presence, having ADHD, having CD and having anxiety disorders were detected as predictors ($p<0.001, \text{Beta}=0.029, 95\% \text{CI} [0.011-0.080]; p=0.002, \text{Beta}=0.190, 95\% \text{CI} [0.066-0.545]; p<0.001, \text{Beta}=0.088, 95\% \text{CI} [0.030-0.257]; p<0.001, \text{Beta}=0.029, 95\% \text{CI} [0.011-0.233]$, respectively) (Table 4).

Table 4. The predictors of psychotropic medication use in children with MR (n=1572).

Predictors of medication use	p	Beta	95%CI
Age (children)	0.262	1.632	0.693-3.843
Sex (male)	0.476	1.185	0.743-1.891
Psychiatric comorbidity presence	<0.001	0.029	0.011-0.080
Having ADHD	0.002	0.190	0.066-0.545
Having CD	<0.001	0.088	0.030-0.257
Having anxiety disorders	<0.001	0.052	0.012-0.233
Having PDD	0.841	1.112	0.393-3.148
Epilepsy presence	0.059	1.720	0.980-3.018

MR: Mental retardation, ADHD: Attention deficit hyperactivity disorder, CD: Conduct disorder, PDD: Pervasive developmental disorders

4. Discussion

In this study, we examined children and adolescents with MR in terms of their clinical characteristics, psychotropic medication use and the predictors of the pharmacotherapy. We found in a six-month period of time that MR as frequent 1.5 times in males as females. All levels of mental retardation have been more frequently described in the literature in male gender [6, 7]. In a study conducted in a university hospital in Turkey, it was detected that 60.3% of 209 cases diagnosed with MR were male, and 39.7% were female [8]. In another study, it was detected that 73% of 200 cases diagnosed with MR were male, and 27% were female [9]. In our study about two thirds of the cases were male, which is consistent with the literature. Although there is no clear evidence, the presence of mental retardation syndrome associated with chromosome X and being boys as being more sensitive to certain diseases such as neonatal sepsis could be causes of these conditions.

In the literature, it was stated that 85% of all MR cases is mild MR, 10% of all MR is moderate MR, 4% of all MR cases is severe MR, and 1% of all MR cases is profound MR and these rates could vary according to age, socioeconomic factors and cultural structure [10]. In our study, it was found that mild MR was the most frequently found group. However, unlike the literature, in our study it was seen that unspecified MR (14.8%) was the third most frequent group. This could result from difficulties of the evaluation of intelligence levels in cases with hearing and/or speech disorders, which they constituted 9.4% of all sample.

In a study conducted in Turkey [8] the prevalence of epilepsy in patients with mental retardation was 28.2%, similarly this rate we found as 21.9% in our study. In the literature it was reported that the prevalence of epilepsy as 0.7% in the normal population, 3-6% in patients with mild MR, 23% in moderate MR and 50% in severe MR [11]. In our study, it was determined that there was a significant correlation between the incidence of epilepsy and MR level. Profound and/or severe MR in patients with epilepsy were often found to have significantly higher incidence of epilepsy than that of seen in other intelligence levels. It was consistent with

findings of previous studies that MR level increases accompanied by increase of the frequency of epilepsy [12]. Another clinical situation that was often associated with mental retardation was CP. In a study, conducted with MR cases in Turkey, CP frequency seen in these cases have been reported at a 14.4% rate [8]. The prevalence of CP in our study was found as a 17.9% rate, which was similar to this finding. It was reported that in 10-15% of cases with MR have visual impairments and 10-15% have hearing problems [13]. Similar with these reports, in our study we found that speaking and/or hearing impairment was 9.4% of the cases.

In another study, it was reported that mental disorders were seen at the rate of 27-71% in patients with mental retardation [14]. Psychopathology in children and adolescents with MR was found as higher because of their environmental features in which they have more exposure to adverse socioeconomic conditions and this was linked to increased psychopathology risk [15]. In our study, the incidence of psychiatric comorbidity was determined as 24.6%. Similar to findings of a study conducted in Turkey [9] in our study psychiatric comorbidity was significantly more frequent in mild MR than that of other subtype of MR. This may result from because of high level of presence of mild MR in our sample. This is the possibility of sufficient sensitivity of tools and methods which we used diagnostic process as mental retardation level increases and difficulty in diagnosing process or patients with severe clinical symptoms of MR may have more limited verbal ability and more difficulty to explain their complaints.

A study, conducted in Turkey, it was reported that 79.4% of male patients with MR and 46.2% of the female have a psychiatric comorbidity [9]. Similarly, in our study, psychiatric comorbidity was found in 65.9% of males and 34.1% of females, which was statistically significant in favor of male. The most frequently identified psychiatric comorbidities in MR were reported as PDD, ADHD, anxiety disorders, mood disorders, psychotic disorders, personality disorders, conduct disorder, posttraumatic stress disorder, tic disorders and eating disorders [16]. In our study, MR comorbid diseases were found as DBD, PDD, anxiety disorders, elimination disorders, mood disorders and tic disorders, in order of frequency, and the comorbidity rates were generally lower than in the literature. Cross-sectional nature of our study and performed retrospectively may have led to this situation.

In the United States, 30-75% of all cases with MR were reported to be prescribed psychotropic drugs [14]. In a study conducted in Turkey showed 62.5% of patients with MR using any of psychotropic drugs [17]. Psychotropic drugs use was found as 20.4% of MR cases in our sample and this ratio is relatively low, compared to above-mentioned rates, due to less comorbidity we found. Most commonly pharmacological agents used in this area were reported as antipsychotics, benzodiazepines, lithium, antiepileptic drugs, tricyclic antidepressants and SSRIs [18]. Likewise, in our study, the most commonly used psychotropic drugs were antipsychotics, followed by MPH and SSRIs. Mostly used antipsychotic was

risperidone and it was consistent with the literature which pointed out that risperidone is effective and tolerable agent in children with mental retardation [19]. MPH was another frequently used medication in children with MR having ADHD comorbidity to their situation. MPH has been reported as effective in behavioral and cognitive functions in children with MR plus ADHD [20], which MPH was found in our series of children with MR having ADHD comorbidity as preferable agent to treat. In our sample, because the most common comorbidity found was DBD, this may have affected MPH and ATX use rates which consistent with the proportion of it mentioned in the literature [21].

In conclusion, the high rate of psychiatric and non-psychiatric medical comorbidity is determined cases in mental retardation. Comorbidity is an important issue with regards to complicate the treatment and compliance and affect negatively on the patient's prognosis and quality of life. In the process of the diagnosis and treatment, paying attention to this case by clinicians who study in this area will be useful to practice correct and affective treatment. Our study has the characteristic of determination that evaluation of cases that admitted to child psychiatry clinic and diagnosed with MR. The most important limitation of our study is that the evaluation is made retrospectively. The relative size of the sample is the most important advantage. There is a need for studies which contains more detailed information, designed as a prospective, multicenter and large sample size to draw up a way of health policies related to the children and adolescents with MR, in Turkey. This type of studies in the future will provide a more comprehensive evaluation of cases with MR and cut-in attempts which should take lifelong in the early stages.

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