

Original article

A study on Theory of Mind among adolescents with Oppositional Defiant Disorder

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Abstract

Background: Oppositional Defiant Disorder (ODD) is a persisting and lasting pattern of negative, hostile, and deviant behaviour linking with a wide range of psychosocial problems. The deficits in social cognition are also one of the major contributors for symptoms in ODD. Theory of Mind is one of the concepts of social cognition.

Aim: The first aim was to examine the concepts of theory of mind in both ODD and healthy adolescents. The second aim was to explore the relationship between severity of ODD and theory of mind.

Method: 25 adolescents with a diagnosis of ODD were recruited for study group and 25 healthy adolescents were recruited for control group. The study was conducted in King George's Medical University, Lucknow, India. Theory of Mind sub-test of SOCRATIS was administered through computer to assess the concept of theory of mind. The severity of ODD was assessed through Severity rating scale for ODD patients.

Results: There were significant differences found in theory of mind between the study and control group. Also, significant negative correlation was found between theory of mind and severity of ODD.

Conclusions: Deficits were found in theory of mind of adolescents with ODD. Adolescents with ODD have difficulty in using reasoning abilities to understand what one person (other than self) thinks about another person's thoughts and identifying a socially awkward situation.

This study also concludes that the more severe ODD symptoms are, the more deficits in TOM were found.

Key words: Oppositional Defiant Disorder, Adolescents, Theory of Mind, Faux Pass

Introduction

Oppositional Defiant Disorder (ODD) is an enduring pattern of negative, hostile, and deviant behaviour, without serious violations of societal norms or the rights of others. It is a disruptive behavior disorder (externalizing disorder) in children and teenagers characterized by patterns of unruly and argumentative behavior and hostile attitudes toward authority figures [1]. The behaviour of an ODD child is more extreme and disruptive as compared with other children without ODD at the same stages of development and occurs more frequently than other types of behavioural issues faced across different age of child development [2]. The estimated prevalence ranges from 2-11% in the general population [3], with an average of 3.3% [1]. Before puberty, the condition is more common in boys (1.4:1) [1,4]; however, after puberty, it is equally common in boys and girls [1]. The disorder usually manifests by 8 years of age [1,5,6]. Apart from disruptive behaviour patterns, a wide range of psychosocial problems are also associated with oppositional defiant disorder [7].

Adolescence is the transitional phase from childhood to adulthood between 10 to 19 years of age [8]. It is a period of growth and development [8]. Within the paradigm of population and development related issues, the role of adolescents cannot be overlooked. The physiological, intellectual, psychological and social developments happen rapidly in these years. The fundamental purpose of these developments is to form one's own identity and prepare the adolescents for adulthood.

Various studies on ODD suggests that adolescents with ODD face problems in social cognition areas related developmental task which influence individuals' upcoming life [9-12]. "*Social*

cognition includes understanding of the processes involved in social interaction and it involves ability to observe emotions in others and to infer what other individuals think, together with the ability to comprehend the individual roles and rules that regulate social interactions [13-15]. The various domains of social cognition include theory of mind (TOM), emotional processing, social perception, and attributional styles [13].

The most representative mechanism of social cognition is “*Theory of Mind*” (TOM), which refers to the ability to correctly attribute the mental states to oneself and also to understand that others have beliefs, desires, etc. that might be different from their own [16]. The ability of a person to represent the mental states and/or to make inferences about others' intentions. TOM includes understanding hints, intentions, false beliefs, deception, metaphor, irony and faux pas [14]. In our study, false-beliefs, metaphor-irony, and faux pas were assessed. These tasks examine the individual's ability to infer mental states of characters, others at different levels of complexity. Two-orders of TOM ability have been described in literature [17]. First-order TOM refers to inferring the thoughts of another person. Second-order TOM refers to the use of reasoning abilities to understand reasoning, what one person (other than self) thinks about another person's thoughts.

“Social information is processed in a linear order, including encoding a social stimulus, storing interpretations of the stimulus, accessing behavioral and affective responses, evaluating the response in terms of expectations, norms, and anticipated consequences, and enacting the response [18,19]. Errors in this sequence may lead to the development of behavioral problems [19]. Children with behavioral problems, especially those with aggressive symptoms, tend to perceive a higher amount of threat in their environment than other children, even in ambiguous or benign situations [18-20]. ToM impairment has been detected in disorders with typical developmental onset (externalizing disorders) [21].

The above review of literature suggests that in adolescents with oppositional tendencies, one of the contributor to cause disruptive behavior is the dysfunctions in theory of mind. All the

studies were done in the overseas and no Indian study was on these domains on ODD patients. Theory of mind is an important concept related with ODD. The present study will give a baseline for future researches in this domain and further help in intervention of adolescents with ODD in areas of deficits. This study is an exploratory research and will help to understand how the severity of ODD affects the development of different orders of TOM. This study will also help to plan an early intervention for children with oppositional symptoms. The first aim of the study was to analyse orders of theory of mind (false-beliefs, metaphor-irony, and faux pas were assessed) in adolescents with ODD and compare it with healthy adolescents. The second aim of the study was to find the relationship between severities of ODD with different orders of theory of mind.

Methodology

Sample Size Estimation

The following formula is used for calculating the adequate sample size, $n = [Z^2P(1-P)]/ d^2$. In our study, the value of Z is 1.96 at 0.95 level of confidence, prevalence value is 0.033 (3.3%) and value of d is 0.05. By using the above formula sample size (n) is found to be 50 in each group. A minimum sample of 25 subjects of patient group and 25 healthy controls were included in study, for which ethical clearance was taken. Appropriate statistical analysis was done to improve the power of the study.

Study Design

It was a cross-sectional and non-interventional study conducted at Department of Psychiatry of a tertiary care centre. The period of data collection was between June 2019 to August 2019. The study sample included all the new and follow-up patients of Oppositional Defiant Disorder (ODD) adolescents attending Child and Adolescent OPD on specific days. Those who provided written informed assent with the consent of their parents and fulfilled the criteria were included in the study. The inclusion criteria for the study group were (i) adolescents' age from 10 to 16

years; (ii) Patients who have an average level of IQ ($IQ \geq 90$). (iii) patients who fulfil the criteria of ODD without any co-morbid disorders according to DSM 5. While the exclusion criteria for the study group were (i) presence of any other co-morbid psychiatric disorder (conduct disorder, ADHD, neurodevelopmental disorders except learning disability, disruptive mood dysregulation disorder, bipolar and related disorder, schizophrenia spectrum and other psychotic disorder,) except behaviour problems and few comorbid features of psychiatric condition; (ii) patient with any major type of disability or medical condition that make the administration of test impossible; (iii) adolescent who do not understand the instructions or uncooperative. None of the patients were enrolled in therapy.

The control sample included adolescents and their parents volunteered from community (Researcher's neighbourhood and children of employee in Psychiatry Department of KGMU, Lucknow). Those who have provided written informed assent and consent and fulfilled the selection criteria were selected into the healthy control sample. The inclusion criteria for the control group were (i) adolescents 'age from 10 to 16 years; (ii) adolescents who have an average level of IQ ($IQ \geq 90$). While the exclusion criteria for the control group were (i) presence of any psychiatric disorder; (ii) presence of any major type of disability or medical condition that make the administration of test impossible; (iii) adolescents who do not understand the instructions or uncooperative. The study group sample's demographic variables like- age, sex, and domicile were group matched with healthy volunteers. Ethical clearance was taken from the research cell of KGMU, Lucknow (Ref No.- 96thECMIIBM.Phil/P2). Researchers (PP, PM) were trained and certified to administer *Theory of Mind Tasks (SOCRATIS)* computer version.

Tools

The screening tools and scales used in this research are mentioned below-

Semi structured personal data sheet for recording demographic, clinical and psycho-social details of the patient and control: To elicit demographic details of the patient and healthy adolescents and clinical details of patients.

Diagnostic and Statistical Manual of Mental Disorders-5 (DSM- 5) [1]: To confirm diagnosis of ODD as per DSM-5 criteria.

Semi-structured Diagnostic Interview K-SADS-PL DSM -5 [22]: To assess other co-morbid psychiatric illness for exclusion.

Severity rating scale for ODD patients [1]: To assess the severity of ODD. It is a clinician-rated scale.

Coloured Progressive Matrices/Standard Progressive Matrices (SPM) [23]: for assessment of IQ.

Theory of Mind Tasks (SOCRATIS) [24]: It is one of the sub-tests of Social Cognition Rating Tools in Indian Setting (SOCRATIS). It is a computer-based test, purchased for the conduction of this study. It contains three sub-tests- First is theory of mind stories including four stories; two in first order theory of mind and two in second order theory of mind. Each story contains four questions each. Second is metaphor-irony sub-test including two stories with two question each. This sub-test comes under second order theory of mind. Third is faux-pas sub-test including 10 stories with 5 clarifying questions and two control questions each. This sub-test also assesses higher order theory of mind. It takes 40-45 minutes in administration. The maximum score on each sub-test is 1.

Procedure

After taking the assent from the adolescents with ODD and healthy adolescents, informed consent from their parents was taken. Patient and control group subjects were screened through K.SADS-PL to rule out other co-morbid psychiatric disorders. Patients and healthy volunteers who fulfilled the selection criteria for study and control group were recruited in the study

respectively. CPM/SPM was administered on both the groups and those who fulfilled the IQ criteria ($IQ \geq 90$) were recruited in the study. Semi-structured proforma was used to collect information about the demographic, clinical and psycho-social variables of the study and control group. Theory of Mind (SOCRATIS) is a computer-based software which was administered on both groups to assess theory of mind.

Results

The data collected through semi-structured proforma and other tests was then statistically analysed. Data was summarized in terms of mean and standard deviation (SD) for continuous variables; frequency and percentage for categorical variables. For comparison between both groups Chi-square (χ^2) test is used for categorical (socio-demographic) variables and Mann-Whitney U-test is used for continuous (clinical) variables. Spearman's correlation was used to measure the relationship among variables. The data is tabulated using Microsoft Excel 2013 software. The statistical analyses was performed on SPSS version 24.

Sample Selection

As shown in the Table-1, 52 and 31 adolescents were screened in the study and control group respectively. From these 52 adolescents in the study group, only 25 (48%) adolescents fulfilled the selection criteria and 27 (52%) were excluded due to various reasons described in the next table. Similarly, in the control group 25 (81%) adolescents were selected and 6 (19%) were excluded.

Table 1: Sample selection in both groups with their frequencies and percentage

Groups	Study group		Control group	
	Number of Patients (<i>f</i>)	Percentage (%)	Number of Healthy Adolescents (<i>f</i>)	Percentage (%)
Total cases screened	52	-	31	-
Total cases excluded	27	52	6	19
Total cases included	25	48	25	81

Table 2: Reason for sample exclusion and their frequency

Reasons for Exclusion	Study Group	Control Group
IQ<90	3	0
Co-morbid psychiatric illness	12	0
Refuse to give consent	2	0
Do not complete assessment	4	2
Both parents not available	6	4
Total	27	6

Table-2 describes the reasons for sample exclusion during screening phase. Out of the total of 52 screened patients who presented as one of their common chief complaints of aggressive and defiant behaviour, only 25 patients were found to be eligible to participate in the study after fulfilling the selection criteria. These 25 patients were assessed further. A total of 27 adolescents were excluded from 52 total screened cases in the study group. In control group, 6 were excluded out of 31 due to incomplete assessment and non-availability of both the parents.

Socio Demographic Details of the Adolescents

The Table-3, shows the frequency and percentage of adolescents and their parents falling in each category within both groups. No statistically significant difference was found in mean age and gender between the study and control group. Most of the sample belonged to urban area. In the study group, 23 (92%) adolescents were living in urban region and only 2 (8%) were living in rural region. In the control group, all the 25 (100%) adolescents belonged to urban area. However, statistically no significant difference was found between both groups in terms of domicile. In terms of education and family type, no statistically significant difference was found between both groups as most of the adolescents had completed only their primary education in both groups and the family type of most of the families in both the groups was nuclear.

Table-3: Compares the socio-demographic details of study and control group in terms of their frequency, percentage and significant difference between both groups

	Study group (N=25)		Control group (N=25)		χ^2	p-value
	<i>f</i>	%	<i>f</i>	%		
Age (10-16 years)	25	100	25	100	0.14	0.93
Mean (SD)	12.92 (1.96)		13.16 (1.91)		-	-
Gender					0.12	0.73
Male	20	80	19	76		
Female	5	20	6	24		
Domicile					2.08	0.15
Urban	23	92	25	100		
Rural	2	8	0	0		
Education*					0.74	0.70
Primary	16	64	13	52		
Middle	6	24	8	32		
High School	3	12	4	16		
Family Type					0.09	0.77
Nuclear	15	60	16	64		
Joint	10	40	9	36		

*According to revised Kuppaswamy's Socioeconomic Status Scale.

Clinical Variables of Study Group

According to the Table-4, in the study group, 21 (84%) patients had no other co-morbid disorder. Out of n=25, 3 (12%) patients had ODD with dissociative symptoms and only 1 (4%) patient had ODD with depressive symptoms.

Table-4: Frequency and percentage of study group on the basis of co-morbid conditions and severity of ODD with mean and standard deviation (SD)

Variables	Number of Patients (N=25) <i>F</i>	Percentage (%)
Co-morbid condition		
Pure ODD	21	84
ODD with Dissociative Symptoms*	3	12
ODD with Depressive Symptoms*	1	4
Severity**		
Mild ODD	16	64
Moderate ODD	7	28
Severe ODD	2	8
Mean (SD) of Severity	1.44 (0.65)	

*Past history of Dissociative and Depressive symptoms. **Mild=1; Moderate=2; Severe=3.

On screening the study group, 16 (64%) patients fell in the mild severity category while 7 (28%) patients fell in the moderate severity category and 2 (8%) patients fell in the severe level of severity of ODD. The mean severity of ODD was found to be 1.44 (0.65).

Comparison Tables

Table-5: Comparison between study and control groups based on theory of mind tasks

Variable	Study group Mean (SD) Max Score=1	Control group Mean (SD) Max Score=1	U-test	p-value
FOT	0.95 (0.1)	1 (0)	250	0.02*
SOT	0.56 (0.22)	0.91 (0.12)	54	<0.01*
FPCI	0.56 (0.18)	0.90 (0.12)	14.5	<0.01*

* Level of significance = 0.05; *FOT-First Order Theory of Mind; SOT-Second Order Theory of Mind; FPCI-Faux Pass Composite Index.*

The Table-5 indicates, the mean scores of first order theory of mind (FOT) in the study and control group were 0.95 (0.1) and 1 (0) respectively which suggests that the control group had slightly high concept of FOT as compared to the study group. The mean score of second order theory of mind in the study group was 0.56 (0.22) and control group was 0.91 (0.12) that shows the control group had better understanding of SOT as compared to the study group. Similarly, the mean score of faux pass composite index in the study group was 0.56 (0.18) and the control group was 0.90 (0.12) showing low score in the study group as compared to the control group. The above table shows statistically significant difference between the study and control group in all the three sub-tests of theory of mind at 0.05 level of significance.

Table-6: Correlation analyses between ODD severity scale and sub-scales of theory of mind tasks

Variables		ODD Severity Scale	
		r_s	p-value
Theory of Mind Tasks	FOT	-0.65	<0.001**
	SOT	-0.83	<0.001**
	FPCI	-0.37	0.07

**Level of significance = 0.01, * Level of significance = 0.05

The Table-6 shows moderate negative correlation between first order theory of mind and severity of ODD as well as a high negative correlation was found between second order theory of mind and severity of ODD. Both of them were statistically significant at a p-value of <0.001.

Discussion

The present study was a cross-sectional and non-interventional study with the aim to examine theory of mind in adolescents with ODD and compare it with healthy controls. The second aim of the study was to examine the relationship between theory of mind and severity of ODD in adolescents.

In this study, the mean age of both the groups was 13 years. No statistically significant difference was found in both the groups based on age. There were 20 males and 5 females recruited in the study group this indicates that ODD is more prevalent in males than females. Gender-matched healthy adolescents included 19 males and 2 females. A meta-analysis study was done suggesting that ODD is more prevalent in males than females [25]. Males are found to be more aggressive in behaviour as compared to females [26]. This makes them more vulnerable to develop externalizing disorders. In this present study, out of a total of 25 adolescents, 21 of them were diagnosed with pure ODD. Rest 3 of the adolescents had current diagnosis of ODD having past history of dissociative symptoms and 1 adolescent having past history of depressive symptoms. Most of the co-morbid disorder conditions have been excluded in the exclusion criteria due to overlapping in the variables under study. In terms of severity, on screening the study group, 64% of the adolescents fell in mild ODD severity while least 8% fell in severe ODD symptom category. This shows that the symptoms in most of the adolescents were only generalized in one setting predominantly i.e., home setting. The mean severity of disorder was found to be 1.44 (0.65). This implies that majority of adolescents with ODD had mild level of severity of ODD.

In terms of domicile, most of the adolescents with ODD belonged to urban region. In our study 23 adolescents with ODD belonged to urban region and 2 belonged to rural region. Researches

indicated that children living in urban region are more likely to develop behavior problems as they are more exposed to psychosocial and physical stressors [27,28]. In healthy adolescents, none belonged to rural region. As domicile matched healthy adolescents were taken in the study sample. Based on education, most of the adolescents with ODD (64%) have just completed their primary education. Similarly, healthy adolescents (52%) have completed their primary education i.e., passed up to class 5th. No statistically significant difference was found between healthy and adolescents with ODD in both groups suggested that their education and grades are not much affected by the pathology in clinical group. The family type of adolescents with ODD and healthy adolescents was primarily nuclear. In adolescents with ODD, 15 (60%) of them were living in the nuclear family while 10 (40%) of them were living in a joint family. On the other hand, 16 (64%) healthy adolescents were living in the nuclear family and 9 (36%) of them were living in a joint family. In urban region, most of the families are nuclear in nature. No statistically significant difference was found in terms of family type between both groups. According to the first aim of the study, a comparative exploration of theory of mind in adolescents with ODD and healthy control. Theory of mind is the ability to understand mental states and beliefs of oneself and others and the use of reasoning abilities to understand that others have different beliefs from oneself [15]. The deficits in theory of mind is related with externalising disorders [21]. The findings of theory of mind tasks of SOCRATIS indicates that the mean scores of FOT, SOT and FPCI in the control group were higher than the scores as compared to the study group. The mean scores in first order theory of mind was found to be the highest as compared to the higher order in theory of mind (SOT and FPCI). This shows that adolescents with ODD had lesser deficits in first order theory of mind and major deficits in second order theory of mind and faux pas. The lesser value on TOM indicates more deficits in TOM. The mean scores on SOT and FPCI came out to be nearly equal 0.56 (0.22) and 0.56 (0.18) respectively. This indicates more deficits were found in higher order of TOM in adolescents with ODD.

Based on the work of Westby, first order theory of mind develops by the age of 4-5 years [29,30]. In our study, the sample included adolescents belonging to age 10 to 16 years this shows that they have slight difficulties in first order theory of mind as it gets developed by the age of 4-5 years. The second order theory of mind starts to emerge from 5 or 6 years of age in children [31]. Another study also gives the similar age of development of SOT emerging from 6 years till 10 years of age [30]. This collaborates with our findings as more deficits were found in SOT than FOT. The adolescents with ODD have just developed their second order theory of mind that is more impaired than first order theory of mind due to their illness.

Another study conducted on recognition of faux pas by normally developing children and children with Asperger syndrome or high functioning autism found that faux pass ability starts to develop between 9 to 11 years of age in healthy children [32]. The findings of our study show clear deficits in faux pas as it is a higher order of theory of mind. On comparison, statistically significant differences were found at 0.05 level of significance between the study and control group in all the three sub-tests of theory of mind. This shows significant differences in all orders of theory of mind between healthy adolescents and adolescents with ODD. Similar findings were reported in other researches stating that disruptive children performed poorly in TOM tasks as compared to healthy individuals [21,33].

The second aim of our study was to find the relationship between theory of mind and severity of ODD in adolescents. Significant moderate level of negative correlation was found between first order theory of mind and severity of ODD at 0.01 level of significance. Similarly, high negative correlation was found between second order theory of mind and severity of ODD at 0.01 level of significance. This suggests that as the severity of ODD was increasing the abilities in first order and second order theory of mind was decreasing. Similar results were found in other studies as well, suggesting a negative correlation between theory of mind and ODD symptoms [21,34,35]. This indicates theory of mind deficits are linked with ODD which means

that as the adolescents develops defiant behaviour, deficits in theory of mind also starts to develop.

According to the Social Information Processing (SIP) model of aggressive behaviour [36,37], 'aggressive adolescents have processing biases in the encoding and interpretation of social cues, resulting in aggressive responses [38]. Some studies also support the SIP model with findings that aggressive adolescents as compared with non-aggressive adolescents, misinterpret neutral social cues while perceiving it as hostile stimuli and are less empathetic [39-41]. While communicating, this misinterpretation of social cues shows a deficit in understanding the beliefs and mental states of others, making them more aggressive and increasing their ODD symptoms.

One of the major limitations of this study is that it has small sample size but this study can be used to get a baseline impression of the constructs and conduct future researches. Also, interventions based on cognitive aspects of TOM can be used to reduce dysfunctions in TOM at an early stage of oppositional symptoms.

To conclude, theory of mind deficits in adolescents with ODD were found to be statistically significant. Adolescents with ODD have difficulty in using reasoning abilities to understand what one person (other than self) thinks about another person's thoughts and identifying a socially awkward situation. The significant negative correlation between theory of mind and severity of ODD indicates that with increased severity of ODD symptoms, deficits in TOM gets worsen. Our study enlightens the relationship between severity of ODD with theory of mind of the adolescents with ODD. The results of the study can be used in the psychotherapeutic intervention of the adolescents with ODD. Deficits in theory of mind may act as early signs and can be used as a precursor to defiant behaviour. The findings of the study can be used to give training in their respective impaired domain (cognitive and affective), to improve oppositional symptoms in adolescents with ODD. However, our study assesses only cognitive dimension of theory of mind. Future researches can take the other constructs of social

cognition like- attributional bias, social cue recognition and four components of theory of mind given by Westby et al. which are cognitive, affective, inter-personal and intra-personal [30].

Conflict of Interest: All authors have disclosed no conflicts of interest.

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