Original Article

Attitude and Knowledge of High School Pupils Towards Adolescents with Special Needs (Tourette's Syndrome)

Uzi Brook and Mona Boaz[1]

Department of Pediatrics, Edith Wolfson Medical Center, Holon, and Sackler Faculty of Medicine, Tel Aviv University, and [1]Edith Wolfson Medical Center, Holon and the Institute for Cardiovascular Research, Sackler Faculty of Medicine, Tel Aviv University, Israel

ABSTRACT

Objective. To determine high school pupils' attitudes towards adolescents with special needs (for example: TS); to learn what they know about the symptomatology and the exceptional behavior of TS; and what they think about their social future.

Methods. Ninety-nine pupils participated in the study. Their mean age was 16.7 ± 0.8 years. Forty-eight point five percent were boys, and the rest girls. They completed a questionnaire concerning knowledge and attitudes towards adolescents with special needs (diagnosed as TS). They had participated in lessons and class talks about handicapped children with psycho behavioral symptoms.

Results. The scores for their knowledge were at a level of 68.9%. Half of the pupils knew and responded correctly that TS was of genetic origin; but the most important: they expressed a comprehensive and tolerant attitude towards impaired behavior in TS at a level of 55.3%. The tolerant attitude increased with advancing age and with school grades. The attitudes were more comprehensive in families suffering form their own emotional or other psychiatric difficulties. Forty-three point four percent of pupils understand and consider TS to be an emotional, behavioral and psychiatric entity. Sixty-two point six percent of pupils understand as well and believe that the disruptive behavior and outbursts in TS are involuntary and not under the adolescent's control. On the other hand, a quarter of the pupils see justification for repeated punishment of TS adolescents for their impaired behavior. Fifty-six point six percent of regular pupils were ready to develop friendship with TS classmates in spite of their unexpect and unruly behaviour. Eight-three point eight percent of pupils believe it is better to inform teachers and classmates about the impaired behavior of these TS adolescents. Concerning the future of these disabled adolescents, pupils scored a level of 44% for their optimistic beliefs about success in future life; 52% believe that in spite of all difficulties TS adolescents would be able to live an ordinary life, to raise a family and to work.

Conclusions. It is crucial to improve pupils' attitudes in schools (as well as their teachers') towards adolescents with special needs (including TS). The authors recommend that TS be considered as a neuro-behavioral and psychiatric disorder; it should be considered as a disability, which calls for comprehension, (not punishment). It would also be of value to speak in classes about the handicaps and neurobehaviorallimitations for example of these TS adolescents, as well as about other pupils in school with special needs, in order to behave socially correctly towards them. The final aim will be that pupils in school will learn to accept the different child and adolescent as they are. **[Indian J Pediatr 2006; 73 (12) : 1099-1104]**
E-mail : brookuzi@post.tau.ac.il

***Key words :** Pupils' attitude; Adolescents; Special needs; Social future*

To authors knowledge till now there are not regular lessons in school concerning the social attitude towards handicapped people; there are sporadic class talks dealing with disabled persons; it had not become an integral part of school lessons. Tourette had been chosen by authors as example of child who have special needs. Tourette's syndrome (TS) is a neuropsychiatry condition,[1] these adolescents have functional impainnent in behavioral inhibition.[2-4] Their self-esteem decreases,[5] their quality of life (QOL) as well as their family functioning is adversely affected.[6-7] Their QOL depend upon the severity of their symptoms and the existing comorbidity.[8-9] TS is expressed in many ways, and the clinical picture varies from one adolescent to another. The comorbidity includes: obsessive-compulsive disorder (OCD),(up to 62.5% in TS)[10] attention deficit and hyperactivity disorder (ADHD), (up to 70% of TS)[11] learning disabilities (LD), anxiety,

Correspondence and Reprint requests : Dr. Uzi Brook, M.D. Department of Pediatrics, Wolfson Medical Center, Holon 58100, Israel, Tele.: 972-9-502-8422. Fax : 972-3-503 8408

tension, excessive worry, immaturity, mood changes, - depression, executive dysfunction, sleep disorder, nocturnal enuresis (even up to the age of 14 years), oppositional defiant disorder (ODD) and conduct disorder (CD).[12-10] The behavioral psychiatric disturbances are expressed in the 12-16 year age group; they include: rage attack, coprolalia, discipline problems, disturbed behavior, conduct disorders and self-injury.[15-17] The prevalence is worldwide and is between 0.05-0.1% in the general population.[12] In the 13-14 year age group, among school populations (in the UK), the prevalence is as much as 3%.[18]

Adolescents diagnosed with TS have to face many difficulties during their years of school attendance, even though their IQ is generally normal or even higher. These difficulties are the result of the association of TS with ADHD; it also predict poor school performance and academic failure;[19] that association (of TS/ADHD/LD) increase as well the risk of peer relationship problems.[20]

According to parents, the most difficult problem is their short temper; they arguing about everything.[21] They will have difficulties at school, with peers and in their family dynamics.[22] Behavioral disturbances cause their social disintegration.[6] Their conduct disorder includes: lying, thievery, fights, vandalism, alcohol consumption, drug abuse and animal abuse.[23] These antisocial behaviors may lead them towards confrontations with the law.

Special emphasis should be given to certain issues in TS: While he is angry the adolescents' coprolalia may become a fequent reaction; this represents an organic failure of prefrontal inhibition control.[24-25] Concerning rage, and explosive behavior-once the outbursts had begun- it is almost impossible to stop them and may end with self-injury.[26] These handicapped adolescents need a prolonged patience, forgiving and a comprehensive attitude towards their unruly behavior; they should be evaluated for the severity of their symptoms, their weakness, peer and family impaired relationship.[1] AACAP (No. 55) recommends teaching the adolescent to control his anger (for example by cognitive behavioral treatment); to convince him to assume responsibility for his actions, while at the same time to accept their consequences (punishments) of his disruptive behavior.[27] Special efforts should be made to prevent school failure and drop-out.[28]

As for prognosis, TS lasts for a whole lifetime.[29] There is a stabilization of symptoms in adulthood, with an increase in severity under stressful situations. The outcome depends upon: presence of comorbidity, coping capacity, interpersonal relationships, impulse control, effective symptom management, family and social support.[30]

The aims of the present study were as follows: to determine what is the high school pupils' knowledge about TS, as a model of adolescents with special needs; to determine what is the high school pupils' social attitude towards TS, and their disruptive behavior; and to determine what high school pupils think if TS adolescents will be able to manage social regular life in their future.

MATERIAL AND METHODS

Ninety-nine high school pupils took part in the present study. They were studying in three classes which were chosen at random (among 24 classes)- in grades: 10, 11, and 12 in an academic high school in the city of Holon, which is the fourth largest city in Israel. Their families belong to a medium socio-economic level. Data of the pupils are shown in Table 1.

TABLE 1. **Data of Participants (n=99)**

Age (years)	16.7± 0.8	
Sex (ratio):		
Boys: Girls(%)	48.5 ± 51.5	
Grade:		
10	26.3%	
11	40.4%	
12	33.3%	
Marks (%)	77.8+14.8	
Parental age (years):		
Father	49.6±5.5	
Mother	45.5±4.1	
No of persons in the home	4.5±1.2	
No of rooms in the home	3.5±1.4	
Years of study:		
Father	12.2±3.2	
Mother	12.1±2.7	
Parental professions (%):	Father	Mother
Academic	22.2	15.2
Teaching	3.0	21.2
Technical	34.3	11.1
Commercial	40.5	22.2
Housekeeper	-	30.3
Previous knowledge and recognition of a person with ADHD/TS	58.6%	
Previous knowledge and recognition of a person with OCD	44.4%	
Psychiatric problems in the family	12.1%	

For some months before the study, there were several talks and discussions in their classes about disabled pupils, handicapped and children with special needs; these lectures were conducted by their teachers, school nurse and physician, and an educational advisor. The topics included ADHD, LD, TS, congenital malformations, genetic syndromes, and handicapped individuals as a result of accidents, etc. Pupils in each class heard at least two lectures by the medical-educational staff A questionnaire created by the authors included 157 items in the initial version. After being tested for their judge validity by two pediatricians, two neurologists, a 'psychiatrist, two psychologists and two educational advisors, 86 items were left in the questionnaire. The following topics were included in the questionnaire: individual and demographic information - 14 items; TS knowledge - 38 items; attitudes towards TS

35 items; the future and follow-up of TS adolescents -5 items; Example often questions trom the questionnaire are presented in Appendix A The statistical analysis was done by the Epidemiological Unit of the medical center and utilized averages, a t-test and correlations. Statistical significance was set at p<0.05.

RESULTS

The scoring of pupils' knowledge about TS is presented in Table 2. A higher score signifies better knowledge. Pupils achieved a level of 68.9%. The scoring of pupils' attitudes towards TS is presented in Tablel 3a and 3b. A higher score signifies a more comprehensive and more tolerant attitude. Pupils achieved a level of 55.3%. A significant correlation was found between positive attitudes and increasing age (r=0.375; p=0.01).

Yet thirty-one percent of pupils believe TS adolescents can control and stop their tics or disruptive behavior when they want (incorrect). 62.6% believe that outbursts of TS adolescents are not under his/her control (correct). 43.4% of pupils believe TS is an emotional and psychiatric disease (correct). Pupils' thoughts about the future of TS adolescents are summarized in Table 4. Pupils achieved a level of 44% for their beliefs about their future life. A higher score signifies positive faith in their future.

TABLE 2. Pupils Knowledge about TS

Pupils	No.	Score	
Grade:			
10	24	20.3	
11	34	19.7 ± 4.1	
12	26	20.8 ± 4.2	
Total	84	20.2 ± 3.9	
Boys	41	19.6±3.8	
Girls	43	20.9 ± 3.9	Statistics: N.S
Pupils having problems in Psychiatrics the family		21.6± 4.3	

Responses to some questions:			
(1) Prevalence of TS among adolescents: posit. answere			Response
	<1%	32.3%	Correct
	10%	55.6%	Incorrect
	25%	6.1%	Incorrect
(2) Background of TS is genetic		46.5%	Correct
(3) TS can be completely cured by Alternative Medicine		46.5%	Incorrect

TABLE 3A. Pupils Attitudes Towards TS

Pupils	No of pupils	Score (min:46/max: 226)	
Grade:			
10	24	118.8 ± 49.1	
11	34	129.2 ± 51.3	
12	26	127.3 ± 50.9	
Total	84	126.2 ± 54.2	
Boys	41	19.6±46.2	
Girls	43	133.2 ± 53.8	
Pupils having psychiatric problems in the family		133.3±52.1	Statistics: N.S

TABLE 3B. Pupils Attitudes Towards TS (in certain questions)

IQ in TS in comparison with normal peers is:	Responding positively (%)
Low	33.3
Medium	55.6
High	11.1
Self-esteem in TS in comparison with normal peers is:	
Low	65.6
Medium	25.3
High	9.1
TS adolescents are considered as having special needs	
People should:	
Empathize with TS adolescents regardless of their curses:	44
Agree to sit near him in class	56.6
Agree to develop friendships with TS adolescents and to invite him to his home	56.6
All pupils in a class should be informed about TS adolescents' symptoms and behavior	83.8
On the other hand:	
TS adolescents should be severely punished in order to currect their disruptive behavior.	27.3
Each act of physical violence by TS adolescents should result in a police file	24.2

Significant correlations were found between the following beliefs and statments:

		r	P
Supportive attitudes and tolerance towards TS adolescents- with	Higher grades level	0.375	0.01
TS is a 'psychiatric disease-with	TS adolescents can control their symptoms (including anger and outbursts)	0.2	0.047
TS adolescents are short tempered-	TS adolescents argue about everything and threaten others	0.375	0.000
TS adolescents can be creative	TS adolescents can be proficient with music, sport or computers	0.444	0.000
Family expenses in TS are enormous	Most families ofTS adolescents are broken	0.4	0.000
TS adolescents argue about everything-	TS adolescents always reject responsibility on others	0.505	0.000

TABLE 4. Pupils Beliefs about TS Adolescents' Future

Pupils	No.	Score
Grade:		
10	24	2.6 ± 1.7
11	34	2.0 ± 1.3
12	26	2.0 ± 1.2
Total	84	2.2 ± 1.5
Boys	41	2.1 ± 1.5
Girls	43	2.3 ± 1.3

Statistics: N.S

Responses to some questions:	Responding positively (%)
(1) Think TS adolescents will drop out of school	80.8
(2) Think TS adolelscents will be able to serve in the army	
(3) Think TS adolelscents will build a regular family life	

DISCUSSION

Concerning pupils' knowledge about TS, a score of 70% is considered quite good; this is probably a result of lectures, talks in class and discussions by medico-educational professionals. The topic of these sessions was adolescents with special needs, taking TS as a model.

But the most important findings in the present study was: the score pupils received for their tolerant and comprehensive attitudes toward TS symptoms and impaired behavior; it was at a level of 56%. Pupils who had psychiatric difficulties in their family received even higher scores (59%). Twenty-seven percent of pupils still believe that there is always a place to severely punish TS adolescents for their disruptive and unruly behavior. They believe that punishment will correct and change their violence and antisocial behavior. Pupils' attitude is influence by: the severity of their symptoms, kind of relationship with TS adolescents, prevalence of quarrels with him; The authors should remember that TS suffer from a marked delay (of years) in their emotional-behavioral and social maturity.[1] Lindback *et al* pointed out that more than half of TS children's experience serious problems with their emotional-behavioral functioning,[31] Interacting withTS adolescents is not easy for their peers, nor for their family members. It is also difficult for their classmates, as well as for their teachers to accept their impudence, curses, impulsive and disruptive behavior.[32] According to parents, the most difficult problems in TS are those associated with ADHD and LD.[33] Coming *et al* pointed out that TS pupils will have school problems with educational handicap.[34] Kurlan mention that 25% of TS pupils require special education.[35] Most difficult of these symptoms to face is their uncontrollable outbursts of rage.[36] The authors should consider TS as handicapped. Their disruptive behavior is tiresome and results in feeling of rejection by their peers.[37] In the study of Friedrich *et al* regular pupils scored TS adolescents less positively.[38] Champion *et al* pointed out that in most cases those who express a more understanding attitude towards their impaired behavior are their close family members (parent or sibling), and/or closed friends.[39] Carter *et al* pointed out that social and emotional adjustment in TS is influence by family functioning and parental support.[14] Surprisingly in many cases their antisocial behavior is directed towards members of their close family (again: parents or sibling); the whole family functioning becomes chaotic. Seventy-nine percent of pupils believe that TS should be considered as a real disability and apply to adolescents with special needs; this shows that these pupils understand that for example, the impaired behavior of TS is not the result of parental failure in their education, but a neuro-behavioral issue; yet Budman *et al* pointed out that their outbursts and disruptive behavior express an organic dysfunction of their brain.[40] Twenty-seven percent of pupils yet are convinced that it is mandatory to repeatedly punish TS adolescents, in order to change their unacceptable behavior with violence. In school there is also a sever lack of knowledge about TS symptoms among their teachers.[41] Lagiewka-Cook *et al* pointed out that it is crucial to inform their teachers about the neurobehavioral uncontrolled symptoms of TS.[32] One quarter of the pupils think that in case TS adolescents apply violence the police should be involved. In their opinion and as prevention TS adolescents should be firmly told beforehand that their impulsive and violent behavior would be of necessity punished.

Wang *et al* mention that the most important thing for TS is: understanding and acceptance from their family, teachers and friends.[42] Fifty-seven percent of pupils declared they are ready to develop a friendship with a TS classmate or sit next to him/her in class in spite of his behavior; This is really a positive attitude. Eighty-three percent of pupils believe there is a risk of school dropout, as a result of their learning disabilities, being realistic and familiar with the association of TS and ADHD/LD. In spite of difficulties, pupils believe that adolescents diagnosed with TS can excel in music, sports or computers; they see the potential and positive character of TS adolescents. Fifty-two percent of pupils think TS adolescents will be able to serve in the army, despite their disciplinary and behavioral difficulties. Thirty-one percent of pupils believe TS adolescents will be able to finally lead a normal family life; two thirds (66%) of the pupils are not sure about the future of TS life.

CONCLUSION

TS should be considered by medical and educational professionals as a group of adolescents with special needs. Teachers, as well as their classmates, should be informed and updated about the non-voluntary symptoms of TS. They should have a special learning program (with less theoretical and less academic lessons). Head teachers and educational advisors will build that program according to his educational disabilities. That

personal program Medical and educational professionals should talk to pupils in their classes about disabilities, handicapped, pupils with chronic disorders and special needs. That kind of social education should be regularly introduced in class during all years of school attendance, starting even trom kindergarten. Tolerant and unqerstanding attitudes towards handicapped people will strengthen moral forces of their society.

CLINICAL IMPLICATION

Regular teaching and discussions should be undertaken in class about disabled children, adolescents and adults with special needs. Pupils should see them as persons with congenital or acquired disability, which means adolescents with special needs. Educational committee in school will create a personal school program, according to their capacity. School nurses and physicians, as well as educational advisors should participate in these educational lessons and social teaching. The Ministries of Education and Health should instruct the teachers; they should receive updated guidance concerning these topics; they should be a positive model and try to persuade pupils in their class to be more tolerant, to exhibit more patience and if possible to encourage these handicapped people.

APPENDIX A: EXANRPLES OF TEN ITEMS FROM THE QUESTIONNAIRE ON TS

Knowledge

- The prevalence of TS among school pupils is 1 %, 10% or 35%?
- The reason for TS development is genetic and is transmitted from parent to child.
- The outbursts and uncontrolled behavior (in TS) are the result of drug abuse.
- Most of these children suffer from ADHD and OCD.
- Can these children in spite of their difficulties succeed in the fields of music, sport and! or computer technology?

Attitudes

- Do you believe an adolescent with TS can control and stop his outbursts and disruptive behavior when he wants?
- Is it always correct to punish these adolescents in order to control their impaired behavior?
- Would you agree to sit in class next to a TS pupil?
- Would you agree to develop a social relationship with a TS adolescent and invite him to your home?
- Is there a possibility that these adolescents will be able to build a regular family life?

REFERENCES

1. Leckman JF, Cohen DJ. Tourette's syndrome: tics, obsessions, compulsions, develop~ental psychopathology and clinical care. New York (NY): *J. Wiley* 1999; p. 338-359.
2. Como PG. Neuropsychological function in Tourette's syndrome. Adv Neurol 2001; 85: 103-111.
3. Kurian R, Como PG, Miller B, Polumbo D, Deeley C *et al*. The behavioral spectrum oftic disorders: a community-based study. *Neurology* 2002; 59 : 414-420.
4. Moyano MB. Psychiatric Comorbidity in Clinical Samples. *Vertex* 2001; 12: 165-175.
5. Thibert AL, Day HI, Sandor P. Self-concept and self-consciousness in adults with Tourette's syndrome. *Can J Psychiatry* 1995; 40 : 35-39.
6. Sukhodolsky DG, Scahill L, Zhang H, Peterson BS, King RA. *et al*. Disruptive behavior in children with Tourette's syndrome: association with ADHD comorbidity, tic severity and functional impairment. *J Am Acad Child Adolesc Psychiatry* 2003; 42: 98-105.
7. Elstner K, Selai CE, Trimble MR, Robertson MM. Quality oflife of patients with Gilles de la Tourette's syndrome. *Acta Psychiatr Scand* 2001; 103 : 52-59.
8. Hubka GB, Fulton WA, Shady GA, Champion LM, Wand R. TS impact on Canadian families functioning. *Neurosci Biobehav Rev* 1988; 12: 259-261.
9. Klassen AF, Miller A, Fine S. Health-related quality oflife in children and adolescents who have a diagnosis of ADHD. *Pediatrics* 2004; 114: e541-547.
10. Kano Y, Ohta M, Nagai Y. Clinical characteristics of Tourette's syndrome. *Psychiatry Clin Neurosci* 1998; 52 : 51-57.
11. Fen CR, Barbosa ER, Miguel EC. Gilles de la T ourette' s syndrome: a clinical study on 58 cases. *Arq Neuropsiquiatr* 2001; 59 : 729-732.
12. Zinner SH. Tourette's disorder. *Pediat in Review* 2000; 21 : 372-383.
13. Wodrich DL, Benjamin E, Lachar D. Tourette's syndrome and psychopathology in a child psychiatry setting. *J Am Acad Child Adolesc Psychiatry* 1997; 36 : 1618-1624.
14. Carter AS, Pauls DL, Leckman JF, Cohen DJ. A prospective longitudinal study of Gilles de la Tourette's syndrome. *Am Acad Child Adolesc Psychiatry* 1994; 33 : 377-385.
15. Step hence RJ, Sandor P. Aggressive behavior in children with TS and comorbid ADHO and OCD. *Canad J Psychology* 1999; 44: 1036-1042.
16. Freeman RD, Fast DK, Burd L, Kerboshian J, Robertson MM, Sandor P. An international perspective on TS: Selected finding ITom 3500 individuals in 22 countries. *Dev Med Child Neuro* 2000; 42 : 436-447.
17. Mathews CA, Waller J, Glidden D, Low TL, Herrera LD, Budman CL, Erenberg G, Naarden A, Bruun RD, Freimer NB Rens VI. Self injurious behavior in TS: Correlate with impulsivity and impuls control. *J Neurol Psychiatry* 2004; 75: 1149-1155.
18. Mason A, Banerjee S, Eapon V, Zeitlin H, Robertson M. The prevalence of Tourette's syndrome in a mainstream schools population. *Dev Med Child Neurol* 1998; 40 : 292-296.
19. Abwender DA, Como PG, Kurlan R Parry K, Feu KA *et al*. School problems in TS. *Arch Neurol* 1996; 53: 509-511.
20. Bawden HN,Stoocks A, Camphield PR, Salisbury S. Peer relationship problems in children with TS or DM. *J Vhild Psychol Psychiatr* 1998; 39: 663-668.
21. Comings DE, Comings BG. Tourette's syndrome: clinical and psychological aspects of 250 cases. *Am J Hum Genet* 1985; 37 : 435-450.
22. Schapiro NA. "Dude, you don't have Tourette's ": Tourette's

syndrome, beyond the tics. *Pediatr Nurs* 2002; 28 : 243-246,249-253.
23. Comings DE, Comings BG. A controlled study ofTourette's syndrome. II. Conduct. *Am J Hum Genet* 1987; 14 : 742-760.
24. Vercueil L. Control ofillller speech and Gille de la Tourette's Syndrom. *Encephale* 2003; 29: 460-462.
25. Goldenberg IN, Brown SB, Weiner WI Coprolalia in younger patients with Gilles de la Tourette's syndrome. *Mov Disord* 1994; 9 : 622-625.
26. Robertson MM, Trimble MR, Lees AJ. Self-injurious behaviour and Gilles de la Tourette's syndrome: a clinical study and review of literature. *Psychol Med* 1989; 19 : 611-625.
27. AACAP: Understanding Violent Behavior in Children and Adolescents. *Amer Acad of Child Adoles Psychiatry* No. 55: Facts for Families.
28. Singer HS, Rosenberg LA. Development of behavioral and emotional problems in Tourette's syndrome. *Pediatr Neurol* 1989; 5 : 41-44.
29. Cohen DI Tourette's syndrome: psychopathology of development in a model of neuropsychiatric dysfunction in children. *Psychiatr Enfant* 1992; 35 : 365-419.
30. Peterson BS. Considerations of natural history and pathophysiology in the psychopharmacology of Tourette's syndrome. *J Clin Psychiatry* 1996; 57 (Suppl 9):24-34.
31. Lindback T, Strand G. Tourette's syndrome in children. An analysis of everyday problems - neurology or emotional conflicts? *Tidsskr Nor Laegeforen* 1994; 114 : 2248-2251.
32. Lagiewka-Cook D, Goulet JL, Wand R, Shady G. Tourette's syndrome: a psycho educational presentation. *Axone* 1993; 41 : 89-91.
33. Dooley JM, Brna PM. Gordon KE. Parent perceptions of symptom severity in Tourette's syndrome. *Arch Dis Child* 1999; 81 : 440-441.
34. Coming DE, Coming BG. A controlled study of TS. 1. ADD, LD, and school problems. *Am J Hum Genet* 1987; 41: 701-741.
35. Kurlan R. Hypothesis 2: TS is part of a clinical spectrum that includes normal brain development. *Arch Neurol* 1994; 51: 1145-1150.
36. Budman CL, Bruun RD, Park KS, Olson ME. Rage attacks in children and adolescents with Tourette disease: a pilot study. *J Clin Psychiatry* 1998; 59: 576-580.
37. Stokes A, Bauden HN, Camfield PR, Backman JE, Dooley IM. Peer problems in Tourette's disorder. *Pediatrics* 1991; 87 : 936-942.
38. Friedrich S, Morgan SB, Devine C. Children's attitude and behavioral intentions towards peer with TS. *J Ped Psych* 1996; 21 : 307-319.
39. Champion LM. Fulton W A, Shady GA. T ourette' s syndrome and social functioning in a Canadian population. *Neurosci Biobehav Rev* 1988; 12 : 255-257.
40. Budman CL, Bruun RD, Parks KS, Lesser M. Olson M. Explosive outbursts in children with Tourette's disorder. *J Am Acad Child Adolesc Psychiatry* 2000; 39: 1270-1276.
41. Shady GA, Fulton WA, Champion LM. Tourette's syndrome and educational problems in Canada. *Neurosci Biobehav Rev* 1988; 12 : 263-265.
42. Wang HS, Kuo MF. TS in Taiwan: en epidemiological study of tic disorders in an elementary school at Taipei County. *Brain Dev* 2004; 25 suppl 1: s29-31.