

Studi sperimentali

The SDQ in Italian clinical practice: evaluation between three outpatient groups compared

L'SDQ nella pratica clinica in Italia: analisi comparativa tra tre gruppi ambulatoriali a confronto

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SUMMARY. Aim. The aim of the study is to evaluate the effectiveness of the Strength and Difficulties Questionnaire (SDQ) as a screening tool for emotional and behavioral problems in three different populations at risk. **Methods.** The SDQ is a brief screening questionnaire that investigates the presence of emotional and behavioural problems in children and adolescents. We have analyzed 497 questionnaires completed by parents of children referred to Child Neuropsychiatry, Pediatric Endocrinology and Pediatric Oncology Units. **Results.** Results indicate a higher presence of psychopathological disorders in Neuropsychiatry patients than Oncology and Endocrinology patients. Furthermore the Oncology patients have more emotional and behavioral problems than Endocrinology patients. **Discussion.** The findings support the use of the SDQ questionnaire in the assessment of emotional and behavioral problems in these populations at risk. So the SDQ could be used by clinicians to detect early psychopathological disorder in children with different kind of chronic organic diseases.

KEY WORDS: early screening, SDQ, psychopathology.

RIASSUNTO. Scopo. Lo scopo del nostro studio è valutare l'efficacia del Strength and Difficulties Questionnaire (SDQ) come strumento di screening per i problemi emotivi e comportamentali in tre diverse popolazioni a rischio. **Metodi.** L'SDQ è un breve questionario di screening che indaga la presenza di problematiche emotive e comportamentali in bambini e adolescenti. Abbiamo esaminato 497 questionari compilati dai genitori di bambini afferenti alle cliniche di Neuropsichiatria Infantile, Endocrinologia Pediatrica e Oncologia Pediatrica. **Risultati.** I risultati indicano una maggiore presenza di disturbi psicopatologici nei pazienti della Neuropsichiatria rispetto a quelli dell'Oncologia e dell'Endocrinologia. Inoltre, i pazienti dell'Oncologia hanno più problematiche emotive e comportamentali rispetto a quelli dell'Endocrinologia. **Discussione.** I risultati supportano l'uso del questionario SDQ per la valutazione di problematiche emotive e comportamentali in queste popolazioni a rischio. Quindi l'SDQ potrebbe essere utilizzato dai clinici per individuare precocemente disturbi psicopatologici in bambini con diversi tipi di patologie organiche croniche.

PAROLE CHIAVE: screening precoce, SDQ, psicopatologia.

INTRODUCTION

Early recognition of psychopathological disorders in developmental age improves the evolution of the disease and the quality of life of the patient. The psychopathological disorders undiagnosed have a greater impact on social, family and health care expenditure. Through awareness pediatricians and general practi-

tioners, which first have the opportunity to observe the young patients, it may highlight emotional and behavioral disorders in children and adolescents.

However, it still happens that children with behavioral difficulties come to Child Psychiatrist after years from the onset of symptoms. This means a worsening of the distress of children and families, limiting the possibility of intervention and a poorer prognosis.

There are several chronic medical conditions that may be complicated by psychopathological disorders. For example, neurological diseases such as migraine, epilepsy, cerebral palsy may be associated with emotional and behavioral disorders (1). Patients with chronic migraine have high frequency of psychiatric comorbidity or psychological distress. The presence of depression, anxiety, panic or obsessive disorders in these patients contributes to poor quality of life and can influence prognosis and treatment. Children with mild mental retardation may develop anxiety and mood disorders, often caused by an awareness of diversity with respect to their peers and by low self-esteem. The concern of having another epileptic seizures and the awareness to take medication for life can promote these disorders in epileptic patients (2). In addition to neurological diseases, others various chronic disorders may be complicated by psychopathological disorders: oncological diseases such as leukemia or lymphoma (3), in which in addition to the discomfort of long hospitalizations and serious side effects of chemotherapy, there is the fear of the fatal outcome of the disease; endocrinological diseases such as diabetes (in which the child is often subjected to numerous controls and chronic therapies) or height-weight deficit (in which teenagers often do not accept their body and reduce relations with peers and with the opposite sex); several other chronic diseases (nephrological, gastroenterological) (4).

Although the clinician should never “delegate” the diagnosis to the instrument, the use of questionnaires can help in the decision to recommend a visit to the child neuropsychiatrist. So the possibility to use suitable tools of screening that can be used with rapidity and clarity by those that can first notice anomalies in the emotional development of children. For this reason, the research of tools that meet these requirements has been always very important, including the Child Behavior Check List (CBCL) (5), and the Strength and Difficulties Questionnaire (SDQ), designed by R. Goodman (6). However these questionnaires can be only an aid in the hands of an expert clinician, who must apply the tools at its disposal flexibly, without eliminating, doing it, objectivity in diagnostic process.

The SDQ has been validated in numerous studies, in which it has been compared with longer and more complex questionnaires, among which the CBCL (5) and the Youth Self Report (YSR) (7).

The advantage of the SDQ in comparison to other questionnaires is the simplicity, the manageability and the speed of its use, integration of ratings from multiple informants, positive wording of some items, characteristics necessary for a screening questionnaire. These characteristics can increase the acceptability by those who answer and consequently the

accuracy of the given answers, so making the questionnaire suitable for individuals of all the social-cultural levels (8,9). The SDQ has been used as a screening tool in various pathological conditions, such as ADHD (10), renal transplantation (TX), acute lymphoblastic leukemia (11), infant-onset eczema (12), neurological disease (epilepsy and cerebral palsy) (1,2), psychiatric pathologies (13,14) and in children with different kind of chronic diseases (4). In all these condition, the SDQ proved to be a useful tool for early detection of psychopathological disorders in children and adolescents.

MATERIALS AND METHODS

The SDQ is a short behavioral screening questionnaire which can be completed in about five minutes by parents and teachers of children aged 4-16 years and as self-report by adolescent aged 11-16 years. The SDQ is available online and it is possible to download it for free from the site www.sdqinfo.com (15). It is a simple questionnaire that investigates the presence of emotional difficulties and behavioural problems of children in the familial and scholastic context. Thanks to a consolidated validation internationally, translated into over sixty languages, including in Italian by A. De Giacomo, P. Dazzan, L. Bernardi, the SDQ contains the necessary requisite of simplicity and effectiveness that favoured its use all over the world as a screening tool for emotional and behavioural problems in wide clinical and population samples. The questionnaire consists of 25 questions presented on a single sheet to which is possible provide 3 types of responses (true, partially true, not true); the score for each question ranges from 0 to 2 points.

The questions are divided into 5 subscales, each of which explores a different area of skill or difficulty, so being able to identify partial scores diversified for:

- behavioural problems;
- emotional symptoms;
- hyperactivity;
- problematic relationships with peers;
- prosocial behavior.

The total score is obtained by summing the scores of all questions of subscales except those related to prosocial behavior and can vary from 0 to 40 points. The partial and total scores are compared to a normative scale that allows to define the cut-off for normal, borderline or abnormal results. In addition, it's possible to define a score of impact thanks to some additional questions on the back of the sheet. The reference ranges of normative data are shown in **Table 1**.

Participant

497 questionnaires have been examined, related to patients aged 4-16 years divided into three groups: Child

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Neuropsychiatry unit (200 patients), Pediatric Endocrinology Unit (151 patients) and Pediatric Oncology Unit (146 patients) of Bari's Polyclinic. The questionnaires were completed by parents. In particular:

1) *Group of Child Neuropsychiatry Unit*: 200 patients of inclusive age between 4 and 16 years. The questionnaire was compiled during a visit to the clinic of child neuropsychiatry, recommended by paediatrician, following specialist consultation for heterogeneous problem list, as follows:

- behavioural problems (33 patients = 16.5%);
- depressive-anxiety-phobic spectrum symptoms (21 patients = 10.5%);
- epileptic seizures (9 patients = 4.5%);
- headache (19 patients = 9.5%);
- psychotic symptoms (16 patients = 8%);
- hyperactivity (26 patients = 13%);
- stuttering (5 patients = 2.5%);
- scholastic difficulties (22 patients = 11%);
- eating disorders (4 patients = 2%);
- friedreich's ataxia (2 patients = 1%);
- enuresis (6 patients = 3%);
- autistic symptoms (15 patients = 7.5%);
- tics (3 patients = 1.5%);
- 19 patients without diagnosis (9.5%).

2) *Group of Pediatric Endocrinology Unit*: 151 patients aged between 4.5 years and 16 years.

The compilation was made during an out-patient control visit for the following pathologies:

- height-weight deficit (24 patients = 15.8%);
- sexual precocity (27 patients = 17.8%);
- obesity (17 patients = 11.2%);
- hypothyroidism (24 patients = 15.8%);
- hyperthyroidism (15 patients = 9.9%);
- diabetes (18 patients = 11.9%);
- various genetic syndromes (18 patients = 11.9%);
- follow-up of leukemic patients (3 patients = 1.9%);
- 5 patients without diagnosis (3.3%).

3) *Group of Pediatric Oncology Unit*: 146 patients aged between 2 and 17 years. The compilation took place during outpatient visit of control for the following pathologies:

- acute lymphoblastic leukemia (90 patients = 61.6%);
- acute myeloid leukemia (9 patients = 6.1%);
- sarcoma (9 patients = 6.1%);
- wilms tumor (10 patients = 6.8%);
- hodgkin's lymphoma (6 patients = 4.1%);
- non-hodgkin's lymphomas (5 patients = 3.4%);
- histiocytosis (3 patients = 2%);
- rhabdomyosarcoma (3 patients = 2%);
- astrocytoma (2 patients = 1.3%);
- medulloblastoma (2 patients = 1.3%);
- hepatoblastoma (1 patients = 0.6%);
- neuroblastoma (2 patients = 1.3%);
- 4 patients without diagnosis (2.7%).

Data analysis

All demographic and clinical variables were subjected to statistical analysis. Descriptive analysis was conducted for socio-demographics features of three samples. Univariate analysis was conducted to determine any associations with double entry contingency tables (2 for 2): "chi-square independence" (χ^2) was used, which allowed us to explore the relationship between two categorical variables. Where possible, it was calculated odds ratio (OR) with 95% confidence intervals (95% CI). If OR is equal to 1, the risk factor does not affect the onset of the disease, if OR is greater than 1, the risk factor is or may be implicated in the onset of the disease, if OR is less than 1 there is a negative association for which the risk factor is actually a defense against the disease. We used the statistical program SPSS 17.0.

Table 1. SDQ range: normative data for the questionnaire completed by parents

	Abnormal	Border	Normal
Emotional symptoms	5-10	4	0-3
Behavior problems	4-10	3	0-2
Hyperactivity	7-10	6	0-5
Peers relationship	4-10	3	0-2
Prosocial behavior	0-4	5	6-10
<i>Total</i>	<i>17-40</i>	<i>14-16</i>	<i>0-13</i>

RESULTS

The socio-demographic characteristics are summarized in **Table 2**.

All results obtained by the three clinical samples examined are compared to the normative data shown previously. The findings show a differences in percentage of abnormality in total score of the questionnaires completed by parents between the three groups, with an higher score in questionnaires of neuropsychiatric patients than endocrinologic and oncologic patients; in turn, oncology's sample obtained scores significantly higher than endocrinology's sample. Among the questionnaires compiled by parents afferent to the outpatient clinics of Child Neuropsychiatry, 93 (46.5%) reported total scores which fall in the range of abnormalities, 88 (44%) reported normal scores and 20 (10%) reported border scores. In many cases the cut-off was exceeded in one or more scales, but not in the total

Table 2. Descriptive variables of clinical samples

	Npi	End	Onc
N children age	200 9.16±3.4	151 8.6±3.7	146 9.4±4.1
Gender male female	80% 20%	63% 37%	72% 28%
Npi: neuropsychiatry; End: endocrinology; Onc: oncology			

score: 72 patients (36%) were abnormal in the scale of emotional symptoms, 98 (49%) in the scale of behavioral problems, 47(23.5%) in the hyperactivity scale, 85(42.5%) in the scale of problematic relationships with peers and finally 21(10.5%) in the scale related to prosocial behaviour (**Table 3**). In 93 cases (46.5%) of the group of the Child Neuropsychiatry with abnormal SDQ score, the outpatient visit confirmed the presence of symptoms suggestive of psychiatric illness or of minor psychopathological disorders.

With regard to the questionnaires compiled by parents afferent to the outpatient clinics of Pediatric Endocrinology, 15 (9.9%) were abnormal in the total score, 115 (76%) reported normal scores and 21 (14%) reported border scores. Within the group of Endocrinology 23 patients (15.2%) were abnormal in the scale of emotional symptoms, 28 (18.5%) in the scale of behavior problems, 6 (3.9%) in the scale of hyperactivity, 24 (15.8%) in the scale of problematic relationships with peers and finally 5 (3.3%) in the scale of prosocial behaviour (**Table 3**).

Finally, with regard to the questionnaires compiled

by parents afferent to the outpatient clinics of Pediatric Oncology, 30 (20.5%) were abnormal in the total score, 93 (64%) reported normal scores and 23 (15.7%) reported border scores. Specifically, 34 patients (23.3%) were abnormal in the scale of emotional symptoms, 50 (34.2%) in the scale of behavior problems, 18 (12.3%) in the hyperactivity scale, 42 (28.7%) in the scale of problematic relationships with peers and finally no one in the scale of prosocial behaviour (**Table 3**).

Furthermore we analyzed the scores that exceeded the cut-off value in all clinical samples. The results show, as expected, more impairment of neuropsychiatry patients than oncology and endocrinology patients. The comparison between neuropsychiatry and endocrinology patients shows statistically significant results: emotional symptoms ($p=.00$), behavior problems ($p=.00$), hyperactivity ($p=.00$), peer relationship ($p=.00$), prosocial behavior ($p=.001$) and total score ($p=.00$).

The comparison between neuropsychiatry and oncology patients shows statistically significant results: emotional symptoms ($p=.007$), behavior problems ($p=.019$), hyperactivity ($p=.009$), peer relationship ($p=.013$), prosocial behavior ($p=.00$) and total score ($p=.00$).

The comparison between endocrinology and oncology patients detects more impairment of oncology patients except for the emotional symptoms subscale (**Table 4**). These differences are statistically significant: behavior problems ($p=.001$), hyperactivity ($p=.008$), peer relationship ($p=.005$), and prosocial behavior ($p=.027$).

Table 3. Frequencies and percentages obtained by SDQ in clinical samples

	Npi (n. 200)			End (n. 151)			Onc (n. 146)		
	Abnormal (%)	Border (%)	Normal (%)	Abnormal (%)	Border (%)	Normal (%)	Abnormal (%)	Border (%)	Normal (%)
Total	93 (47%)	88 (44%)	20 (9%)	15 (9.9%)	21 (14%)	115 (76%)	30 (20.5%)	23 (15,7%)	93 (64%)
Emotional symptoms	72 (36%)	85 (43%)	3 (21%)	15 (10%)	38 (25%)	98 (65%)	34 (23%)	62 (42%)	50 (35%)
Behavior problems	98 (49%)	60 (30%)	42 (21%)	28 (18%)	52 (34%)	71 (48%)	50 (34%)	70 (48%)	26 (18%)
Hyperactivity	47 (23%)	71 (36%)	82 (41%)	6 (4%)	23 (15%)	171 (81%)	18 (12%)	32 (22%)	96 (66%)
Peers relationship	85 (42%)	48 (24%)	67 (34%)	24 (15%)	35 (23%)	92 (62%)	42 (29%)	40 (27%)	64 (44%)
Prosocial behavior	21 (10%)	37 (19%)	142 (71%)	5 (3%)	15 (10%)	131 (87%)	2 (3%)	12 (8%)	132 (89%)
Npi: neuropsychiatry; End: endocrinology; Onc: oncology.									

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Table 4. Frequencies and percentages obtained by SDQ in clinical samples

	Npi (200) (%)	End (n. 151) (%)	Onc (n. 146) (%)	P (χ^2)			Value (OR)			95% Confidence Interval					
				npi- end	npi- onc	end- onc	npi- end	npi- onc	end- onc	Lower npi- onc	end- onc	Upper npi- onc	end- onc		
Total	93 (47%)	15 (10%)	30 (20%)	.00	.00	.007	4.68	2.19	4.68	2.83	1.54	.264	7.73	3.09	.830
Emotional symptoms	72 (36%)	23 (15%)	34 (23%)	.00	.007	.104	2.36	1.59	.674	1.5	1.12	.416	3.5	2.26	1.09
Behavior problems	98 (49%)	28 (18%)	50 (34%)	.00	.019	.001	2.63	1.35	.511	1.83	1.04	.343	3.79	1.74	.760
Hyperactivity	47 (23%)	6 (4%)	18 (12%)	.00	.009	.008	5.9	1.90	.322	2.59	1.15	.132	13.4	3.14	.789
Peers relationship	85 (42%)	24 (16%)	42 (29%)	.00	.013	.005	2.67	1.44	.540	1.79	1.07	.346	3.99	1.94	.842
Prosocial behavior	21 (10%)	5 (3%)	0 (0%)	.01	.00	.027	3.17	/	/	1.22	/	/	8.21	/	/

Npi: neuropsychiatry; End: endocrinology; Onc: oncology.
 *p.value <.05.
 For Prosocial behavior has not been possible to calculate Odds Ratio (OR).

DISCUSSION

The study shows a statistically significant difference in abnormal results of the SDQ compiled by parents of three outpatient samples: the sample of Child Neuropsychiatry has achieved significantly higher scores (ie, more shifted toward abnormality) compared to the sample of Endocrinology and Oncology. Furthermore Oncology sample obtained scores significantly higher than Endocrinology sample with the exception of emotional symptoms. Interestingly, oncology sample shows higher scores compared to a German normative sample (obtained with the German parent-rated SDQ) in total scale (10%), Emotional symptoms (7.7%), Conduct problems (6.6%), Hyperactivity/Inattention (9.8%) and Peer problems (7%) (16). Endocrinology sample shows higher scores than normative sample in Emotional symptoms, Conduct problems and Peer problems. Both samples show lower scores than normative sample in prosocial behaviour (7.1%), indicative of greater impairment in this area.

The starting point of our study is the finding that in a high percentage of cases, patients which refer to pediatric clinics for neurological and chronic organic conditions may also show emotional and behavioral disorders. In a study conducted in the United States the prevalence of psychiatric disorders in a pediatric community was estimated at 20% (17,18). These disorders can occur in psychopathological comorbidity with organic diseases, particularly chronic ones, which can

influence the situations of emotional stress in children: in these conditions a significant increased risk of emotional and behavioral problems has been found (19-21). Diseth et al. (11) assessed the mental health and health-related quality of life (HRQOL) in children and their parents after renal transplantation (TX) compared to healthy controls and children with acute lymphoblastic leukemia (ALL). TX children showed significantly higher levels of mental health problems and lower HRQOL at 2 to 16 years after transplantation compared to both control groups.

The psychopathological disorders may also persist during the rehabilitation phase or remission of the disease. Reinfjell et al. (3) assessed the mental health and psychosocial adjustment of children in remission from acute lymphoblastic leukaemia (ALL), and parental functioning compared to healthy controls. Children in remission from ALL showed on average significantly more problems regarding mental health and psychosocial adjustment, as reported by their parents, compared with healthy controls. Adequate rehabilitation and follow-up programmes should be implemented for children in remission from ALL.

Some studies show that although children with chronic not neurological disorders have a risk of developing emotional and behavioral disorders almost double than general population, those with epilepsy have a risk four times higher, while the risk would be even greater in subjects with structural brain problems such

as cerebral palsy (1,2). Furthermore the behavioural problems are common in children with cerebral palsy (CP), even more when epilepsy is present. Parents identify these problems, and professionals need to address them. Carlsson et al. (22) described behavioural problems in children with cerebral palsy (CP) with and without epilepsy. Somatic complaints such as headache, muscular and abdominal pains can hide a psychological discomfort (23,24). In most cases, these somatic manifestations lead to seek organic pathologies, often with repeated hospitalizations in pediatrics; in reality are psychological problems that children and teenagers often can not verbalize and describe. The results obtained are in agreement with the literature, in fact patients hospitalized for organic diseases show psychological problems in both emotional and behavioral.

The SDQ is used as a screening tool for ADHD, particularly Ullebo et al. (10) have shown it is predictive algorithm had an acceptable sensitivity for the ADHD combined subtype, but low sensitivity for the ADHD inattentive and the ADHD hyperactive subtypes.

European studies conducted by R. Goodman on the use of the SDQ as a instrument for the screening of infantile psychiatric disorders in ample sample of the population have underlined a close correlation between elevated scores to the questionnaire and clinical diagnosis for psychiatric pathologies (1,13). In a study conducted by Glazebrook et al. (4) the SDQ was administered to 307 children during external clinical consultations in a hospital and to a control group represented by a community of 10438 children, of age between 5 and 15 years. The results have underlined that a fifth of children who have attended the Pediatric Clinic for internal Medicine pathologies, has totaled an elevated score of abnormality in the SDQ for emotional and behavioral problems, suggesting a possible psychiatric disorder (frequency twice as high as the control population).

These data confirm what already been underlined in a study by Rutter on the probability, around double, of the presence of an emotional-behavioral disorder in children with physical illnesses (2). In the same study the profile of emotional difficulties did not differ nor for sex, nor for social class. The "psychiatric risk" was clearly higher for those children who had a brain disorder and then attended the neurological clinic (about 6 times greater than the control sample), suggesting a close association between disabling conditions and problems of adaptation or tolerance to possible frustrations. This underscores the importance of the figure and function of the specialist in Child Neuropsychiatry to be able to deal properly with the different problems.

There are no studies in the literature that compare psychological symptoms of pediatric oncologic and endocrinologic patients, also with other questionnaires, but only studies that highlight the correlation between organic disorders and psychopathological problems. The study we conducted is the only one that compares these types of populations, through the use of the SDQ questionnaire as screening tool for the detection of psychopathological problems in childhood. Regarding the effectiveness of the questionnaire, the results of our study agree with those reported in the literature about the existence of a close correlation between high scores on the SDQ and the presence of symptoms related to psychiatric disorders. This is especially true when one considers the differences of results in the three samples considered and within the subgroups of disease, being able to preliminary demonstrate a high validity and good sensitivity of the questionnaire: the patients with more important psychopathological problems, show more elevated scores to the SDQ (is emphasizes in particular the high score obtained by patients with severe psychiatric disorders). It is also worth noting the high score obtained by the epileptic patients of the Child Neuropsychiatry sample, in agreement with that reported in the literature about the vulnerability of these subjects to emotional and behavioral problems. Similarly, the questionnaires compiled by the 2 patients with a diagnosis of Friedreich's ataxia have exceeded the cut-off for state borderline/abnormality in the subscale of the problematic relationship with the peers, highlighting the difficulties of integration that these neurological pathologies cause.

These observations confirm the high validity and good sensitivity of the Italian translation of the SDQ questionnaire and support, ultimately, the possibility of use of it as a tool for identification of emotional-behavioral disorders in clinical populations at risk (patients with heterogeneous organic diseases). However, due to the small size of samples is not possible to definitively prove the reliability of the questionnaire, if one considers the large number of children with chronic illnesses, or who are at risk for psychopathological problems. In conclusion, the possibility to use suitable tools of screening that can be used with rapidity and clarity by those people that can first notice anomalies in the behavior of children or adolescents at risk, ie their parents, is very important. This, would allow the pediatricians to precociously recommend a specialistic consultation to the services of Child Neuropsychiatry. In addition, the SDQ could be used for epidemiological research on large samples of patients with diverse chronic organic diseases, at risk for emotional and behavioral problems. For this purpose it would be useful

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establish a network connection between the various pediatric centers in Italy, with the ability not only to be able to download and complete online the SDQ questionnaire, as it is now possible, but also to be able to insert data into a single database.

Finally we need to underline that the SDQ is an effective screening questionnaire for the psychopathological disorders in the growing age, but as every other screening questionnaire, we cannot expect that give an individual diagnosis. The diagnosis is possible after a complex neuropsychiatric evaluation, that uses the observation of the spontaneous behavior of the child, clinical interviews and standardized tools.

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