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The Discriminative Ability of the Azeri Version of the Strengths and Difficulties Questionnaire in Outpatient Practice

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Abstract

In this study we examined the validity of the Azeri version of the Strengths and Difficulties Questionnaire (SDQ). The SDQ was administered to the parents of two samples of 4–16-year-old children: the case group was drawn from children presenting to the psychiatric outpatient service ($n = 347$) and the comparison group from the pediatric outpatient service ($n = 267$). The total difficulties score and the scores for each subscale were compared between two groups. The proportion of children with the total difficulties score in the abnormal range was higher in the case group than in the comparison group (74 and 34 %, $p < 0.001$). The mean difficulties score difference between two groups was significant (mean difference = 6.3, $p < 0.001$). The Receiver Operating Characteristics analysis showed good discriminative ability for the total difficulties score and difficulties subscales ($p < 0.001$). SDQ distinguished well between groups.

Keywords

Screening; Strengths and Difficulties Questionnaire; Azeri; Psychiatric disorders; Children

Introduction

There is growing awareness in the community of a considerably high prevalence of psychiatric disorders among children and adolescents (Alyahri and Goodman 2008; Anselmi

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Ethical standard The study was approved by the Ethic Commission of Azerbaijan Psychiatric Association.

et al. 2010; Mullick and Goodman 2005; Vicente et al. 2012). However, there is still a serious gap between the number of children with psychiatric disorders and the proportion of them referred to mental health specialists (Costello and Janiszewski 1990; Kumpulainen and Räsänen 2002). On the other hand, early recognition of psychiatric disorders in children and adolescents may improve the evolution of the disorder and consequently the quality of life of the patients. Therefore, it is important to develop an effective mechanism for screening of psychiatric disorders in children and adolescents that would be simple and relatively cheap.

The Strengths and Difficulties Questionnaire (SDQ) is a screening measure that is brief and easy to administer. There are other advantages of the SDQ: it is multi-informant, some items have a positive wording, and both difficulties and strengths are covered (Goodman 1997; Goodman and Scott 1999). The validity and reliability of the SDQ has been shown in numerous studies both in western (Essau et al. 2012; Gómez-Beneyto et al. 2013; Koskelainen et al. 2000; Marzocchi et al. 2004; Obel et al. 2004; Shojaei et al. 2009; Smedje et al. 1999; Widenfelt et al. 2003) and non-western cultures (Alyahri and Goodman 2006; Lai et al. 2010; Mansbach-Kleinfeld et al. 2010; Samad et al. 2005; Woerner et al. 2004). Goodman showed that the original SDQ has an ability to discriminate between high and low risk groups similar to that of the Rutter questionnaires, while SDQ provides better coverage of inattention, peer relationship problems, and prosocial behavior (Goodman 1997). Despite its brevity, the SDQ is comparable to the Child Behavior Checklist (CBCL) questionnaire in detecting internalizing and externalizing problems, and may be better than the CBCL in detecting inattention and hyperactivity (Goodman and Scott 1999; Klasen et al. 2000; Warnick et al. 2008; Widenfelt et al. 2003).

Initially, the SDQ was designed to assess psychiatric disorders in children aged 4–16 years (Goodman 1997), and later a version for children aged 2–4 years was developed. It consists of 25 items grouped in 5 subscales, each subscale consisting of 5 items: conduct problems, hyperactivity/inattention, emotional symptoms, peer relationship problems, and prosocial behavior. Each subscale score can be calculated separately and a ‘total difficulties’ score is calculated by summing the four deficit focused subscales (conduct problems, hyperactivity/inattention, emotional symptoms, peer relationship problems).

Originally developed in English (Goodman 1997, 1999), the SDQ has been translated into over 75 languages, including the Azeri version of the SDQ. The original versions of the SDQ (Goodman 1997, 1999) as well as its translated versions (Alyahri and Goodman 2006; Klasen et al. 2000; Samad et al. 2005) have been shown to discriminate well between community and psychiatric samples. In order to investigate the effectiveness of the Azeri version of the SDQ as a screening measure, we administered the SDQ to two clinical samples: children attending outpatient psychiatric service and outpatient pediatric service. This is the first study evaluating a screening questionnaire for mental health problems in the child and adolescent population in Azerbaijan.

Materials and Methods

Sample and Diagnostic Subgroups

We collected the parent version of SDQ from all outpatients (age 4–16 years) referred to Medina Medical Center between June 2011 and December 2012. All SDQ questionnaires were presented to the parents and completed by them, before they actually met the doctor. We selected two groups of patients. The first group was selected from the children referred to child neuropsychiatry service (the case group). Children who presented with psychopathological complaints and went through a clinical examination by child and adolescent psychiatrists and received a psychiatric diagnosis were included. We excluded children with serious neurological comorbidity, such as epilepsy, mental delay, dyslexia or other specific learning disabilities.

The second group (the comparison group) consisted of healthy children, who came for regular check-up and children with somatic (syncope or fever) or neurological (febrile seizure) complaints, who received no diagnosis of a chronic pediatric or neurological condition. All children admitted because of syncope and febrile seizures went through neurological examination and EEG studies to exclude other neurological conditions. Records with one or more missing items on any of the five SDQ subscales were excluded.

Questionnaires

Behavioral and emotional problems of the children and adolescents were rated with the Azeri version of the SDQ. The original SDQ version for 4–17 year olds was translated into Azeri by a group of researchers and the back-translation of the Azeri version was compared to the original questionnaire (Goodman 1997) and revised by the SDQ's author. The SDQ is readily available online and it is possible to download it for free from the site www.sdqinfo.com. The SDQ measure consists of 25 items. The items are divided into 5 subscales, each of which explores a different area of skill or difficulty: four subscales refer to difficulties (hyperactivity/inattention, emotional symptoms, peer relationship problems, and conduct problems) and one to strengths (prosocial behavior). Each subscale consists of 5 items. Each item is rated on a 3-point scale (not true, somewhat true, and certainly true).

The SDQ total score is obtained by summing the scores of all items, except the ones related to prosocial behavior, and it can range from 0 to 40 points. Besides the total difficulties score, a score for each subscale can be calculated. The subscale scores and the total difficulties score can be defined as normal, borderline or abnormal by comparing actual scores to a normative scale (Goodman 1997).

Statistical Analysis

The data of the total problem score, the four difficulties subscales (emotional symptoms, conduct problems, hyper-activity/inattention, and peer relationship problems) and prosocial behavior subscale were analyzed. Statistical analyses were performed using SPSS (version 19.0, Chicago, IL, USA).

The total difficulties score as well as the difficulties subscale scores were categorized as normal, borderline or abnormal based on normative data cut-off values (Goodman 1997). Chi square independence (χ^2) test was applied to analyze the relationship between two categorical variables: one of the two patient groups (pediatric or psychiatric) versus the normative cut-off score (normal, borderline or abnormal).

Also, in order to evaluate the discriminative validity of the SDQ, we performed Receiver Operating Characteristics (ROC) analyses (Hanley and McNeil 1982). ROC analysis calculates sensitivity and specificity for all possible cut-off points of a score (the SDQ total difficulties score and the five subscales scores in this study), and then combines them in a single value called the area under the curve (AUC). The AUC reflects the discriminative validity of the SDQ: an AUC value of 0.5 indicates that the discrimination is no better than a chance, whereas an AUC value of 1.0 indicates a perfect association between scale scores and clinical diagnosis. First, we performed ROC analysis with the comparison group consisting of all psychiatric cases for the total difficulties score as well as all five subscales. Additionally, we performed ROC analysis with the case group including only diagnoses that match the psychopathology measured by the subscale and calculated the AUC for some subscales: the case group included 141 cases with only externalizing disorders for hyperactivity/inattention and conduct problems scores, the case group included 136 cases with only internalizing disorders for emotional problems scores, the case group included 27 cases with pervasive developmental disorder for prosocial score.

Results

General Results

Of total 685 questionnaires, 71 questionnaires were excluded because of missing items and the rest of questionnaires were analyzed.

The case group consisted of 347 children (mean age: 8.3 ± 3.4 years; males: 66 %). Overall, 141 children had an externalizing disorder (including hyperkinetic disorders, tic disorders and conduct disorders) and 136 had an emotional disorder (including anxiety, depressive disorder and obsessive-compulsive disorder), 3 children had both an externalizing disorder and emotional disorder, 27 had a pervasive developmental disorder and the rest (40 children) had other psychiatric diagnoses not included in these categories (elimination disorders, stuttering, nightmare disorder). There was a higher proportion of boys in the case group (69.5 % males) than in the comparison group (61.4 % males) with the difference reaching statistical significance ($\chi^2 = 4.33$, $df = 1$, $p < .05$).

The comparison group consisted of 267 children (mean age: 7.4 ± 3.3 ; male: 61 %). Of these patients, 227 were examined by a child neurologist and went through routine EEG study. Among children in this group, 10.5 % were healthy ($n = 25$), 28.5 % had febrile seizures only ($n = 76$), 30.0 % had syncope ($n = 80$), and the rest 31.1 % had other non chronic somatic problems ($n = 83$).

Independent Samples *t* Test (Table 1)

The mean of the total difficulties score in the case group (mean 20.6 ± 6.0) was higher than in the comparison group (mean 14.3 ± 6.3). The mean difference was statistically significant (mean difference = 6.3, $p < 0.001$, 95 % CI 5.4–7.3; effect size $r = 0.456$). The mean difference between the two groups was statistically significant ($p < 0.001$) for all five subscales.

In the case group, the subscale scores differed between boys and girls. The mean emotional symptoms score was significantly higher for girls (6.2 ± 2.4) than for boys (5.5 ± 2.5 ; mean difference = 0.74, $p < 0.05$, 95 % CI 0.2–1.3). The mean prosocial behavior score was higher for girls (7.4 ± 2.3) than for boys (6.6 ± 2.6) (mean difference = 0.87, $p < 0.05$, 95 % CI 0.3–1.6). However, the mean hyperactivity/inattention score was significantly higher for boys (6.8 ± 2.5) than for girls (6.1 ± 2.5) in the case group (mean difference = 0.77, $p < 0.05$, 95 % CI 0.2–1.3).

ROC Analysis

The discriminative value of the total difficulties scale and the four difficulties subscales of the Azeri version of the SDQ are summarized in Table 2. The discriminative ability of the Azeri version of the SDQ is reflected in the ROC curves shown in Fig. 1. The AUC values were greater than 0.6 for all scales when the case group consisted of all 347 cases ($p < 0.001$). The AUC value was greatest for total difficulties scale (0.786). Among difficulties subscales the AUC was greatest for the hyperactivity/inattention sub-scale and least for the conduct problems subscale. The AUC values for hyperactivity/inattention, conduct problems, emotional problems and prosocial behavior subscales were higher than 0.7 when the case group consisted of cases with only diagnoses that match the psychopathology measured by particular subscale (Table 2).

Chi Square Test

The difference in the total difficulties scale score of SDQ (categorized as “normal,” “borderline,” and “abnormal”) between the case group and the comparison group was significant ($\chi^2 = 110.205$, $df = 2$, $p < 0.001$, Cramer’s $V = 0.424$). The difference between two groups was also significant for all subscales of SDQ ($p < 0.001$). The effect was large for hyperactivity/inattention and emotional symptoms subscales (Cramer’s $V = 0.35$) and medium for peer relationship problems and conduct problems subscales (Cramer’s $V = 0.21$).

Discussion

In this study we investigated the discriminative value of the Azeri version of the SDQ in an outpatient clinical practice. The SDQ discriminated well between the group of psychiatry service patients and the group of pediatric patients. The discriminative value of the SDQ was investigated with independent samples *t* test and ROC analyses for raw scores and with Chi square independence test for categorized scores.

The mean total difficulties score in the case group (mean = 20.6 ± 6.0) was higher than in the comparison group (mean = 14.3 ± 6.3), with the mean difference reaching statistical

significance ($p < 0.001$). In this study, the subscale scores were different among boys and girls in the case group. The mean emotional symptoms score and the mean prosocial behavior score were significantly higher for girls than for boys in this group ($p < 0.05$). On the contrary, the mean hyperactivity/inattention score was significantly higher for boys than for girls ($p < 0.05$). Nationally representative surveys in US, UK and France showed that parent-rated scores for emotional symptoms and prosocial behavior were higher for girls and conduct problems and hyperactivity/inattention scores were higher for boys (Shojaei et al. 2009) in these countries. Similarly in the large population-based study in Germany, girls scored higher on emotional symptoms and prosocial behavior subscales, whereas boys had higher scores on conduct problems and hyperactivity/inattention subscales (Rothenberger et al. 2008). Hyperactivity and peer relationship problems were more frequently reported for boys, whereas girls received higher scores on prosocial behavior in the population based Dutch study (Muris et al. 2003). In the Yemeni population, the prevalence of oppositional-conduct disorders and ADHD were markedly and significantly higher among boys than girls (Alyahri and Goodman 2006).

In order to assess the discriminative value of the SDQ independently from specific cut-off values, we also used ROC analyses. In ROC analyses, the absolute score values are used, which means that the analyses don't rely on cut-off values that categorize the scores as normal or abnormal. Instead, the sensitivity and specificity values are calculated for all possible cut-off points of a score and then they are represented as the area under the curve (AUC). In this study, the calculated AUC was more than 0.7 for total difficulties score and more than 0.6 for all difficulties subscales (the AUC higher than 0.6 suggests good discriminative ability). When ROC analysis was performed with the case group consisting of cases with only diagnoses that match the psychopathology measured by particular subscale (e.g., cases with internalizing disorders for emotional problems subscale, cases with externalizing disorders for hyper-activity/inattention and conduct problems subscales, pervasive developmental disorder cases for prosocial behavior subscale), the AUC values were higher than 0.7. These results suggest that the discriminative ability of the Azeri version of the SDQ is significantly higher than chance.

For Chi square independence t test, we categorized scores as "normal," "borderline" and "abnormal." We used published cut-off values for total difficulties scores as well as for five subscales scores. However, these cut-off values were produced from population-based studies in UK. Mean score values may vary among countries (Obel et al. 2004) and this is reflected in different cut-off values applied in different countries (David and Mark 2004; Goodman 1997; Koskelainen et al. 2000; Lai et al. 2010; Mansbach-Kleinfeld et al. 2010; Rothenberger et al. 2008; Woerner et al. 2004). Obviously, changes in the cut-off values influence the sensitivity and the specificity of the SDQ (Gómez-Beneyto et al. 2013). Therefore, a large population-based study in Azerbaijan is needed to justify the cut-off values. Nevertheless, when scores were categorized based on the published British cut-off values, the difference in SDQ scores between case and comparison groups was significant, implying that these cut-off values might be applicable for the Azeri population of children and adolescents. In this study, there were significantly more cases categorized as abnormal in the group of psychiatric patients (13.8 % borderline and 73.5 % abnormal) than in the control group. However, of the children in the pediatric patients group, 34.1 and 18.0 %,

respectively, had abnormal and borderline total difficulties scores, suggesting possible psychiatric disturbances. There is a higher prevalence of emotional and behavior problems in pediatric primary care compared with the prevalence measured in community samples (Bilfield et al. 2006; Polaha et al. 2011). Our findings are in agreement with other studies that showed higher SDQ scores in clinical nonpsychiatric samples. The SDQ administered to children during external clinical consultations in a hospital showed that children attending pediatric out-patient clinics were more than twice as likely to score in the abnormal range of the SDQ compared to a control group represented by a community sample of 10 438 children (Glazebrook et al. 2003). In a study conducted by De Giacomo et al. the SDQ total difficulties scores of the patients from outpatient clinics of pediatric endocrinology were abnormal and borderline in 9.9 and 14 % of the cases, respectively (De Giacomo et al. 2012). In the same study, the SDQ total difficulties scores of the patients from outpatient clinics of pediatric oncology were abnormal and borderline in 20.5 and 15.7 % of the cases, respectively. Therefore, this suggests that if the Azeri version of the SDQ is administered to a large community based sample and then compared to psychiatric patients, then the difference between the two groups would be even greater than the difference between the groups in the present study.

There are several notable limitations of this study. First, since the SDQ is the first tool for measuring psychopathological symptoms in children and adolescents available in Azeri language, we could not compare SDQ results with any other validated reference tool. Second, we used published British cut-off values for the total difficulties scale and five subscales. Although ROC analysis showed that British cut-off values have acceptable sensitivity and specificity for the total difficulties score, the cut-off values for some subscales are not optimal (for example, sensitivity and specificity of prosocial behavior subscale at the cut-off of 7.5 are 75 and 51, respectfully). In the future, the cut-off values should to be adjusted for the Azeri population. Third, we used a pediatric clinical sample as a comparison group. Data provided by a large community sample would serve as a better reference for a comparison.

Conclusions

The results of the present study support the usefulness of the Azeri version of the SDQ as an effective screening instrument for psychiatric disorders in the child and adolescent population. It may be used in clinical work, for example as a tool for early identification of psychiatric disorders in the settings of primary healthcare. Our results suggest the Azeri version of the SDQ may also be a useful tool in epidemiologic research. A population based study of larger scale is necessary to investigate the internal consistency and the structural validity of the Azeri version of the SDQ.

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Fig. 1.
Receiver Operating Characteristics (ROC) curves for the SDQ total difficulties score

The results of independent samples *t* test of SDQ total difficulties score and all subscales in clinical groups of psychiatric (case group) and nonpsychiatric (comparison group) patients

Table 1

	Mean score (SD)		Independent samples <i>t</i> test		
	Case group	Comparison group	<i>t</i>	Mean difference (SD)	95 % CI
Total difficulties	20.6 (6.0)	14.3 (6.3)	12.7 *	6.3 (0.5)	5.4–7.3
Hyperactivity/inattention	6.6 (2.5)	4.5 (2.4)	10.1 *	2.1 (0.2)	1.7–2.4
Conduct problems	3.9 (2.2)	2.9 (1.9)	6.0 *	1.0 (0.2)	0.7–1.7
Emotional problems	5.7 (2.5)	3.7 (2.6)	9.5 *	2.0 (0.2)	1.6–2.4
Peer relation problems	4.4 (1.6)	3.0 (2.0)	8.5 *	1.3 (0.2)	1.0–1.6
Prosocial behavior	6.8 (1.9)	8.3 (2.6)	–8.2 *	1.6 (0.2)	1.2–1.9

SD standard deviation, CI confidence interval

* 612 df, *p* <0.001

Table 2

The results of Receiver Operating Characteristics (ROC) analysis of SDQ total difficulties score and all subscales in clinical groups of psychiatric (case group) and nonpsychiatric (comparison group) patients

ROC analysis						
	AUC (SE)	95 % CI	Cut-off values (abnormal range)	Sensitivity %	Specificity %	Case group (n)
Total difficulties	0.77 (0.019) *	0.73–0.81	16.5 (17–40)	74	66	All cases (347)
Hyperactivity/inattention	0.70 (0.020) *	0.68–0.76	6.5 (7–10)	55	78	All cases (347)
	0.815 (0.022) *	0.77–0.86	6.5 (7–10)	70	78	Cases with externalizing disorders (141)
Conduct problems	0.63 (0.022) *	0.59–0.67	3.5 (4–10)	57	67	All cases (347)
	0.72 (0.026) *	0.67–0.78	3.5 (4–10)	66	78	Cases with externalizing disorders (141)
Emotional problems	0.71 (0.021) *	0.69–0.75	4.5 (5–10)	67	66	All cases (347)
	0.75 (0.024) *	0.70–0.77	4.5 (5–10)	72	66	Cases with internalizing disorders (136)
Peer relation problems	0.68 (0.021) *	0.64–0.72	3.5 (4–10)	64	60	All cases (347)
Prosocial behavior	0.68 (0.021) *	0.64–0.73	4.5 (0–4)	95	20	All cases (347)
	0.83 (0.047) *	0.74–0.91	4.5 (0–4)	95	51	Cases with PDD (27)

SD standard deviation, *ROC* receiver operating characteristics, *AUC* area under the curve, *SE* standard error, *CI* confidence interval, *PDD* pervasive developmental disorder

* $p < 0.001$