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Questionnaire screening for mental health problems in Bangladeshi children: a preliminary study

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■ **Abstract** *Background*: In the developing world, child psychiatric disorders are common but child mental health professionals are scarce. A cheap and effective method for detecting child psychiatric problems would be useful. The present study examined the potential suitability of the Strengths and Difficulties Questionnaire (SDQ) for this role. Methods: SDQs were administered to the parents and teachers of 261 Bangladeshi 4-16 year olds: 99 drawn from a psychiatric clinic and 162 drawn from the community. Self-report SDQs were completed by 11-16 year olds. Children from the clinic sample were assigned psychiatric diagnoses blind to their SDQ scores. Results: SDQ scores distinguished well between community and clinic samples, and also between children with different psychiatric diagnoses in the clinic sample. A simple algorithm based on SDQ scores was used to predict whether children had hyperkinesis, conduct disorders, emotional disorders or any psychiatric disorder - rates of predicted disorder varied markedly between clinic and community samples. Conclusions: Predictions based on multi-informant SDQs potentially provide a cheap and easy method for detecting children in the developing world with significant mental health problems. The potential effectiveness of any such

screening programme should be evaluated on a broad range of children, using both international and culture-specific assessments.

Introduction

In the developed world, child psychiatric disorders cause serious distress or social impairment to around 10-20% of children at any one time (Bird 1996). What few studies there have been of child psychiatric disorders in developing countries suggest that the prevalence there may be at least as high (Nikapota 1991), which is perhaps unsurprising since so many children in the developing world are exposed to poverty, malnutrition, infectious diseases, violence and social disintegration. Child psychiatric disorders are important not only because they result in suffering for children and those around them, but also because they interfere with social and educational development and can lead to life-long social and psychiatric problems (Rutter 1996). There is a pressing need for cheap and effective methods for detecting child psychiatric disorders in developing as well as developed countries. Brief questionnaires may have a role to play in this screening process.

The Strengths and Difficulties Questionnaire (SDQ) is a behavioural screening questionnaire for the common forms of child and adolescent psychopathology. Originally published in English (Goodman 1997), and subsequently translated into over 40 languages, the SDQ is brief and available without charge for non-commercial purposes. In a large British study, multi-informant SDQs detected psychiatric disorders in the community with a specificity of 95% and a sensitivity of 63% (Goodman et al. 2000a). Using British norms and a computerised algorithm, the SDQ predicted clinical diagnosis as accurately in child mental health clinics in Bangladesh as in Britain

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(Goodman et al. 2000b), supporting the cross-cultural relevance of the SDQ and raising the possibility that the SDQ might be useful as a screen for psychiatric disorders in community or paediatric clinics in Bangladesh. The present study looks further into this possibility by examining how well the Bangla versions of the SDQ distinguish between community and psychiatric samples. While the complex diagnostic algorithms in use in developed countries depend on computers, simpler algorithms that do not rely on computers would currently be more useful in Bangladesh. Consequently, the present study aimed to establish locally derived SDQ cut-offs and simple analytic methods that could potentially identify children in the community with a high likelihood of mental health problems.

Subjects and methods

Clinic sample

A multidisciplinary child mental health clinic in Dhaka, the largest city in Bangladesh, administered the SDQ to parents, teachers and young people at the time of the first assessment. The children referred to this specialist clinic came predominantly from families of medium socio-economic status, being neither affluent nor extremely poor. The questionnaire was read out when the respondents' literacy skills were insufficient for them to complete the questionnaire directly. Questionnaires were administered to a consecutive series of 146 new patients aged 4-16 years when first seen between June and December 1998; 44 were excluded from further analyses because either the parent or the teacher had not filled in a questionnaire; a further 3 were excluded because missing answers to some questions made it impossible to generate all scores. The present sample consists of the remaining 99 new referrals. While parent and teacher SDQs were completed on all these subjects, a complete self-report SDQ was only available on 35 (53%) of the 66 subjects aged between 11 and 16. The mean age of the sample was 12.5 years (SD 3.5 years) and 55% (54/99) were male.

Community sample

The community sample was collected from Mohammadpur, a largely residential area within Dhaka. The area was chosen because the families who lived there were very similar in socio-economic background to the families who made up the clinic sample, i.e. the great majority of families were of medium socio-economic status. Most parents and children were literate and almost all 4- to 16year-olds attended school. Children between the ages of 4 and 16 were obtained through a two-stage ascertainment programme. In the first stage, a stratified random sample of schools was selected from the list of schools held by the education authority, stratifying for age band (kindergarten, school), source of funding (state or private), and type (boys, girls, coeducational). The chosen schools were two kindergartens (coeducational, private), two boys schools (one state, one private), two girls schools (both private) and one coeducational school (private) - there were no state kindergartens, girls schools or coeducational schools in the area. All the randomly chosen schools agreed to participate. In the second stage, children were randomly selected from class registers. Parents were visited at home and all agreed to take part in the study. Parents, teachers and young people completed SDQs, with the questionnaire being read

out when the respondent did not have adequate literacy skills. The children sampled in this way are likely to be a fairly representative sample of this neighbourhood, with the exception that the area contained some small pockets of slum housing where many children did not attend school – children from these very poor families will have been systematically under-sampled by our school-based ascertainment strategy.

Two hundred 4- to 16-year-old subjects were assessed between March and July 1999; 38 of these subjects were excluded from the analyses reported here either because it was not possible to get teacher as well as parent SDQs, or because missing answers to some questions made it impossible to generate all scores. The community sample consists of the remaining 162 subjects (81% participation rate). While parent and teacher SDQs were completed on all of these 162 subjects, a complete self-report SDQ was only available on 94 (89%) of the 106 subjects aged between 11 and 16. The mean age of the sample was 12.0 years (SD 2.9 years), and 52% (85/162) were male. The community and clinic samples were well matched for gender (continuity-adjusted $\chi^2=0.04$, 1df, NS) and for age $(t=1.1,\ 179df,\ NS)$.

Questionnaires

The SDQ asks about 25 attributes, some positive and some negative. The items, which were selected on the basis of contemporary diagnostic criteria as well as factor analyses, are divided between five scales of five items each, generating scores for Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems, and Prosocial Behaviours. All items contributing to the first four subscales are summed to generate a Total Difficulties Score. The same questionnaire can be completed in about 5 min by parents or teachers of children aged 4-16. There is also a self-report version (Goodman et al. 1998) for those aged 11 and above. An extended version assesses the impact of any psychiatric symptoms in terms of resultant distress, social impairment or burden for others (Goodman 1999). The SDQ has been shown to be of acceptable reliability and validity, performing at least as well as the lengthier and longer-established Rutter questionnaires and Child Behavior Checklist (Goodman 1997; Goodman and Scott 1999). The web site at www.sdqinfo.com provides more information on the SDQ plus downloadable versions of the questionnaires in many languages.

The various versions of the SDQ were translated into Bangla by the first author, after clarifying possible ambiguities in the English with the second author, who wrote the original version. Three psychiatrists, a psychologist, a general practitioner, a journalist and a teacher made independent back-translations. There were few differences between the original and the seven back-translations - discrepancies were resolved by panel discussion. Great care was taken to ensure that the translation was culturally sensitive, using only those words and idioms that would readily be understood by all Bangla-speakers irrespective of their social or educational backgrounds. The versions of the SDQ used in the study were the informant and self-report versions, including impact supplements, all being scored in the standard manner (Goodman 1997; Goodman et al. 1998; Goodman 1999). Parent and teacher SDQs were administered to all subjects (age range 4-16 years), whereas self-report SDQs were only administered to 11-16 year olds.

Clinical diagnosis

Children from the psychiatric clinic were assigned clinical diagnoses based on the operationalised criteria of ICD-10 (World Health Organization 1994). These clinical diagnoses were made at the time of the initial assessment by the first author, who was the senior clinician involved in the assessment. All diagnoses were phenomenologically based, drawing on the extensive information

on symptoms and resultant impairments gathered from multiple informants. These diagnoses were made blind to the children's SDQ scores. Diagnoses were collapsed into three broad categories to provide cell sizes that would be sufficient for meaningful analysis. These categories were hyperkinesis, conduct disorder (including oppositional disorder) and emotional disorder (including anxiety, depressive and obsessive compulsive disorders). Overall, 47 patients had an emotional disorder, 18 had a conduct disorder, and 11 had a hyperkinetic disorder (with 5 patients meeting criteria for more than one of these three broad categories). The remaining 28 patients without an emotional, conduct or hyperkinetic disorder all had some other psychiatric diagnosis, e.g. psychosis or autism.

Statistical analysis

The ability of different SDQ scales to distinguish between community and clinic subjects was examined using Receiver Operating Characteristic (ROC) curves, employing the area under the curve (AUC) as the index of discriminant ability. As a guide to interpretation, the area under a ROC curve is 1.0 for a measure that discriminates perfectly, and 0.5 for a measure that discriminates with no better than chance accuracy. With the number of subjects in this study, the difference between an AUC of around 0.6 and 0.5 is statistically significant, i.e. an AUC of 0.6 is statistically reliable in the sense that that the level of prediction is significantly better than chance. Clinically, however, this level of prediction seems unlikely to be useful. A substantially higher benchmark of 0.8 was adopted to highlight measures that might generate clinically useful predictions.

To generate ROC curves for each SDQ scale, the community sample was compared with the most relevant clinical group. For four of the SDQ scales – the total difficulties scale, the total impact scale, the peer problems scale and the prosocial behaviour scale – the comparison was between all community subjects and all clinic cases. The remaining three scales – covering emotional, conduct and hyperactivity symptoms – were judged by comparing the entire community sample with those clinic cases who had the corresponding disorder. For example, the discriminant power of the SDQ *emotional* scale was judged by comparing all community subjects with those clinic cases who had been diagnosed as having an *emotional* disorder.

Results

Table 1 summarises the ability of different SDQ scales and informants to distinguish between community and clinic subjects, as gauged by the area under a receiver operating characteristic curve (AUC). Using an AUC of 0.8 or more to identify scales that might generate clinically useful predictions, four SDQ scales seem potentially useful for predictive purposes: total impact, emotional symptoms, conduct problems and hyperactivity. In each case, the AUC was significantly greater than 0.5 (P < 0.001). By contrast, total difficulties, peer relationship problems and prosocial behaviour did not distinguish well between the clinic and community samples.

Did the emotional, conduct and hyperactivity scores discriminate within the clinic sample between patients with different sorts of disorders? This was also examined using the area under ROC curves

Table 1 Ability of different Strengths and Difficulties Questionnaire (SDQ) scores to distinguish between community and clinic samples

SDQ score	Area under curve (SE) comparing community and clinic ^a samples			
	Parent rated	Teacher rated	Self rated	
Total impact ^{b,c} Total difficulties ^{b,c} Emotional symptoms ^{b,d} Conduct problems ^{b,e} Hyperactivity ^{b,f} Peer problems ^{b,c} Prosocial behaviour ^{b,c}	0.87 (0.02) 0.64 (0.03) 0.78 (0.03) 0.93 (0.03) 0.92 (0.03) 0.49 (0.04) 0.67 (0.03)	0.89 (0.02) 0.65 (0.03) 0.88 (0.03) 0.83 (0.05) 0.95 (0.02) 0.45 (0.04) 0.64 (0.04)	0.89 (0.03) 0.54 (0.06) 0.87 (0.04) 0.72 (0.08) 0.92 (0.03) 0.46 (0.06) 0.39 (0.06)	

^a The clinic sample includes all clinic cases for total impact and difficulties, peer problems and prosocial behaviour. For the remaining scores, only clinic cases with the corresponding diagnosis are included, e.g. the area under the curve (AUC) for emotional symptoms is for all community subjects compared with just those clinic cases who have an emotional disorder

^b For the community sample, N = 162 for parent and teacher ratings, N = 94 for self-ratings

^c For the clinic sample, N = 99 for parent and teacher ratings, N = 35 for self-ratings

^d For the clinic sample, N = 47 for parent and teacher ratings, N = 21 for self-ratings

^e For the clinic sample, N = 18 for parent and teacher ratings, N = 6 for self-ratings

^f For the clinic sample, N = 11 for parent and teacher ratings, N = 2 for self-ratings

(Table 2). For example, the SDQ emotional score discriminated well between patients with emotional disorders and psychiatric controls, i.e. clinic patients without an emotional disorder but with other diagnoses instead. Similarly, conduct and hyperactivity scores all discriminated satisfactorily between clinic cases with and without the corresponding type of disorders. All AUCs represented a level of prediction substantially better than chance (P < 0.001).

Since the results reported so far showed that the most discriminating SDQ scores in a Bangladeshi sample were those covering impact, emotional symptoms, conduct problems and hyperactivity, these were the only SDQ scores included in the Bangladeshi predictive algorithm. Current diagnostic criteria (World Health Organization 1994) and previous experience with the SDQ (Goodman 1999; Goodman et al. 2000b) suggest that child psychiatric disorders are best diagnosed from the combination of symptom and impact scores. Consequently, families of ROC curves generated by combining SDQ impact and symptom scores were reviewed in order to establish which symptom-impact combinations provided a suitable basis for 'suspecting' psychiatric disorder. Multi-informant predictions were devised to combine SDQ information from all available informants. A hyperkinetic disorder was only 'suspected' when criteria were met according to at least two informants - reflecting the emphasis on pervasiveness in

contemporary diagnostic criteria for hyperkinesis (World Health Organization 1994). By contrast, emotional and conduct disorders were suspected when the criteria were met for any one informant. The SDQ criteria for suspecting psychiatric disorders in a Bangladeshi sample are summarised in Table 3 and form the basis for the simple paper-and-pencil algorithm in the Appendix.

For each category of rater, and also for the combined multi-informant prediction, it was possible

to examine how many community and clinic subjects met the relevant 'suspicion' criteria. As shown in Table 4, the proportion of subjects meeting these criteria was substantially higher for clinic cases with the relevant diagnosis than for community or psychiatric controls (all differences significant on χ^2 testing, with the exception of non-significant differences in the rates of conduct disorder judged solely from self-report SDQs). Predicting hyperkinesis by combining SDQ information from all informants, the proportion

Table 2 Ability of different SDQ scores to distinguish between disorders within the clinic sample

SDQ score	Comparing clinic cases with and without	Area under curve (SE)		
with and without		Parent rated	Teacher rated	Self rated
Emotional symptoms ^a Conduct problems ^b Hyperactivity ^c	Emotional Disorder Conduct Disorder Hyperactivity Disorder	0.84 (0.04) 0.94 (0.03) 0.87 (0.05)	0.86 (0.04) 0.84 (0.05) 0.91 (0.03)	0.89 (0.05) 0.81 (0.07) 0.89 (0.05)

^a For parent and teacher ratings, N = 52 for clinic subjects without an emotional disorder and N = 47 for clinic subjects with an emotional disorder; the corresponding totals for self-ratings were N = 14 and N = 21

Table 3 Criteria for suspecting psychiatric disorder on the basis of individual SDQ scores (First letter: *P* parent, *T* teacher, *S* self-report; Second letter: *I* Impact score, *E* emotional symptoms score, *C* conduct problems score, *H* hyperactivity score)

Predicting from	Predicting to			
	Emotional Disorde	rConduct Disorder	Hyperkinesis	Any Psychiatric Disorder
Parent SDQ only Teacher SDQ only Self-rated SDQ only Multi-informant SDQ	$TI \ge 2 \& TE \ge 6$ $SI \ge 2 \& SE \ge 8$	$TI \ge 2 \& TC \ge 6$ $SI \ge 2 \& SC \ge 6$	$TI \geq 2 \& TH \geq 8$ $SI \geq 2 \& SH \geq 7$	Meets any of the criteria to the left Meets any of the criteria to the left Meets any of the criteria to the left Meets any of the criteria to the left

Table 4A-D Predicting disorder from cut-offs on SDQ scores

Proportion meeting SDQ "suspicion" criteria	Basis of prediction			
	Parent SDQ only	Teacher SDQ only	Self-rated SDQ only	Multi-informant SDQ
A Predicting hyperkinesis Community sample Clinic cases without hyperkinesis Clinic cases with hyperkinesis	6.2% (10/162) 23.9% (21/88) 72.7% (8/11)	3.7% (6/162) 18.2% (16/88) 90.9% (10/11)	4.3% (4/94) 12.1% (4/33) 100% (2/2)	3.1% (5/162) 13.6% (12/88) 81.8% (9/11)
B Predicting conduct disorder Community sample Clinic cases without a conduct disorder Clinic cases with a conduct disorder	3.1% (5/162) 6.2% (5/81) 77.8% (14/18)	2.5% (4/162) 7.4% (6/81) 38.9% (7/18)	1.0% (1/94) 3.5% (1/29) 16.7% (1/6)	5.6% (9/162) 12.4% (10/81) 77.8% (14/18)
C Predicting emotional disorder Community sample Clinic cases without an emotional disorder Clinic cases with an emotional disorder	8.6% (14/162) 13.5% (7/52) 51.1% (24/47)	6.2% (10/162) 15.4% (8/52) 74.5% (35/47)	4.3% (4/94) 14.3% (2/14) 57.1% (12/21)	10.5% (17/162) 19.2% (10/52) 83.0% (39/47)
D Predicting any psychiatric disorder Community sample All Clinic cases	13.0% (21/162) 59.6% (59/99)	9.9% (16/162) 67.7% (67/99)	7.5% (7/94) 48.6% (17/35)	17.9% (29/162) 77.8% (77/99)

^b For parent and teacher ratings, N = 81 for clinic subjects without a conduct disorder and N = 18 for clinic subjects with a conduct disorder; the corresponding totals for self-ratings were N = 29 and N = 6

^c For parent and teacher ratings, N = 88 for clinic subjects without a hyperactivity disorder and N = 11 for clinic subjects with a hyperactivity disorder; the corresponding totals for self-ratings were N = 33 and N = 2

meeting 'suspicion' criteria was 3% for the community sample and 82% for the clinic cases, representing an odds ratio of 141 (relative risk = 27). The corresponding odds ratios (relative risks) were 60 (14) for conduct disorders, 29 (8) for emotional disorders and 16 (4) for any disorder.

Discussion

It was possible to discriminate between community subjects and clinic patients on the basis of the SDQ scales covering total impact, emotional symptoms, conduct problems and hyperactivity. By contrast, peer problems, prosocial behaviour and total difficulties did not discriminate well between community and clinic samples. The impact score was generally high for all clinic patients, whatever type of psychiatric disorder they had. By contrast, the emotional, conduct and hyperactivity scores were more specific to the type of psychiatric disorder. This specificity could potentially be useful if SDQs are obtained prior to the initial clinical assessment. For example, children whose parent and teacher SDQ scores suggest that they are at a particularly high risk of a hyperkinetic disorder could be allocated to a hyperkinesis clinic or to a professional with particular expertise in this domain.

Particularly in a developing country with very limited access to child mental health professionals, there is a pressing need to develop simple screening mechanisms to help ensure that referrals to child mental health services are appropriate. It would be unrealistic to develop screening mechanisms that depend on complex or expensive measures and have to be administered by highly trained staff. A brief questionnaire such as the SDQ, represents a relatively cheap and easy screening mechanism, though two provisos deserve mention. The first proviso is that the questionnaire needs to be read out to respondents who are not literate. The second proviso is that predictions based on multi-informant SDQs - particularly the combination of parent and teacher SDQs miss fewer disorders than do SDQs obtained from just one category of rater. Both these provisos increase the amount of work required to screen with adequate sensitivity and specificity.

In the developed world, the results of SDQ questionnaires can be turned into diagnostic predictions by complex scoring algorithms that require computers (Goodman et al. 2000b). This need for computer-assisted scoring is acceptable in countries where primary health care teams and child mental health teams routinely have access to computers. In less economically developed countries, by contrast,

dependence on computer-assisted scoring would seriously limit the value of a screening programme. Like the measure itself, the system for generating scores and predictions needs to be cheap, simple and portable. The diagnostic algorithms presented in this paper were developed with this need in mind. Simple transparent overlays are available to facilitate the scoring of individual SDQs. There is also a simple paper-and-pencil scheme for converting these scores into diagnostic predictions (Appendix).

In summary, the present study provides preliminary evidence that the Bangla version of the SDQ may predict psychiatric diagnosis accurately enough to be of value in screening and assessment. Several limitations of the current study deserve mention. Firstly, the clinic patients were drawn from a highly specialised tertiary referral centre; future studies will need to test the value of SDQ predictions in less specialised child health or mental health settings. A second limitation is that the children from both the clinic and community sample were predominantly drawn from families of medium socio-economic status - poor by the standards of the developed world, but not generally subject to the extreme poverty, illiteracy and marginalization experienced by many severely disadvantaged families in Bangladesh. A future challenge is to examine how well the SDQ works when applied to children at the greatest social and economic disadvantage. A third limitation is that the children from the community sample were not subsequently assessed in more detail, using standardised interviews and "blind" raters to generate psychiatric diagnoses. SDQ predictions have been shown to agree well with independent psychiatric diagnoses in a large British community sample (Goodman et al. 2000a), but it remains to be seen whether the same is true for Bangladeshi community samples. A final limitation is that using a translated English questionnaire to screen for problems in Bangladesh can only be valid to the extent that the chosen indicators of psychopathology transcend differences in language and culture (Patel and Winston 1994). The fact that the SDQ is as predictive of psychiatric diagnosis in Dhaka as in London supports the cross-cultural robustness of the SDQ (Goodman et al. 2000b). It is also encouraging that conceptually similar screening questionnaires for adult mental health problems are culturally robust (Beusenberg and Orley 1994; Furukawa and Goldberg 1999; Bhui et al. 2000). Nevertheless, future studies should examine how accurately predictions based on the SDQ identify those Bangladeshi children who are considered to have emotional or behavioural problems by local communities and traditional care providers.

Appendix

Paper and pencil algorithm for converting multi-informant Strengths and Difficulties Questionnaire (SDQ) scores into diagnostic predictions

PARENT SDQ	Emotional Conduct Hyperactivity Impact	0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10	If Emotional ≥ 7 AND Impact ≥ 2 Then tick here □	If Conduct ≥ 6 AND Impact ≥ 2 Then tick here \Box	If Hyperactivity ≥ 8 AND Impact ≥ 2 Then tick here \Box
TEACHER SDQ	Emotional Conduct Hyperactivity Impact	0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6	If Emotional ≥ 6 AND Impact ≥ 2 Then tick here □	If Conduct ≥ 6 AND Impact ≥ 2 Then tick here \square	If Hyperactivity ≥ 8 AND Impact ≥ 2 Then tick here □
SELF SDQ	Emotional Conduct Hyperactivity Impact	0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10	If Emotional ≥ 8 AND Impact ≥ 2 Then tick here \Box	If Conduct ≥ 6 AND Impact ≥ 2 Then tick here \square	If Hyperactivity ≥ 7 AND Impact ≥ 2 Then tick here □
			If ≥ 1 of the above are ticked then: SUSPECT EMOTIONAL DISORDER Tick here □	If ≥ 1 of the above are ticked then: SUSPECT CONDUCT DISORDER Tick here □	If ≥ 2 of the above are ticked then: SUSPECT HYPERACTIVITY DISORDER Tick here □
			If any of these specific disorders are ticked then SUSPECT PSYCHIATRIC DISORDER Tick here $\hfill\Box$		

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