APPLICABILITY OF RUTTER-B SCALE ON INDIAN POPULATION

SAVITA MALHOTRA, PRITI ARUN & ADARSH KOHLI

ABSTRACT

Applicability of Rutter-B Scale for completion by teachers was assessed on a representative sample of 963 school children between the ages of 4-11 yrs. The findings revealed that at the recommended cut-off score of 9, the scale has low sensitivity (51.8%) and very low specificity (34.1%). Concordance between assessment by Rutter-B Scale and clinical assessment to pick up psychiatric disorder was 33.6%. Limitations of the scale as a screening instrument in child psychiatry epidemiology are discussed.

Key words : Rutter-B Scale, child psychiatry disorders, screening tools

In India, 37% of the total population is comprised of children. In order to plan for mental health care of this population an accurate assessment of the magnitude of the problem is required. Few epidemiological studies reporting prevalence of behavioural problems in children in India have reported varied results (Malhotra & Kohli, 1995). Absence of good screening instrument, grossly inadequate number of trained mental health professionals and scarce resources are major causes of the paucity of good epidemiological studies. For the purpose of epidemiological research, screening instruments are used. Other methods of finding rates of mental illness e.g. psychiatric interviews and standardised interview schedule are expensive, time consuming and impractical for large scale studies. For this purpose use of screening instruments is invaluable as larger sections of population can be assessed using limited time and manpower. Although there exist some well standardised screening instruments for assessing prevalence of psychiatric disorder in the community, these have not been standardized for Indian population. There are very few valid and reliable instruments available for use in children in India.

Rutter-B Scale for completion by teachers (Rutter, 1967) is a scale which was developed as a screening instrument. This scale assesses a child’s classroom behaviour. This scale is short (26 item), self administered and easy to use. The teacher indicates according to the behaviour described in the statement whether the said behaviour certainly applies (score 2), applies some what (score 1), or does not apply (score 0). Possible range of the score is 0 to 52. A cut off score of 9 has discriminative value, any child scoring 9 or above is classified as a problem child. This scale is applicable to children of both sexes above the age of five years. The Rutter-B Scale has been shown to have an adequate reliability, of 0.72 between raters and a retest reliability using the same teacher, of 0.89 (Rutter, 1967). It has been widely used.

In India Rutter-B Scale has been used in a few epidemiological studies. In a study by Parvathavardhini (1983) psychiatric disorder was reported in 10.6% of children using Rutter-B Scale. In a study on school children, Devasagamani (1990) found that 16.1% were positive on Rutter-B, out of which 40.2% were psychiatrically disordered. Efforts have been made to increase the specificity and the sensitivity of the scale by altering the cut-off scores. In a rural population in West Bengal,
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Banerjee (1997) raised the cut off score of Rutter-B from existing 9 to 17 based on his own validity study. Of the total sample 47.3% children scored above cut off on Rutter-B Scale, out of which 62.8% had psychiatric disorder. In U.K., Kolvin et al. (1977) raised cut off score of Rutter-B Scale to 10 and found 17.1% of school children scored above cut off.

To arrive at a reliable diagnosis in case of children it is highly desirable that information should be obtained from more than one source. These informants are children's parents, teachers, and children themselves.

There may be discrepancy between information obtained from different informants. Various studies have reported correlation between parents and teachers assessment of children's behaviour problems. Achenbach et al. (1987) in a meta analysis of 119 studies reported a mean correlation of 0.27 between parent and teacher assessment of behaviour and emotional problem of children. This shows that concordance in information obtained from parents and teachers about behaviour problem of children is only 7.29%. Discrepancy in information obtained from parents and teachers can be expected as they observe a child in different conditions.

In India correlation between teachers and parents assessment of children's behaviour problems has not been studied so far. Due to socio-cultural factors being different from western countries this correlation may not be the same as reported in western literature.

In India as well as in west, researchers have used Rutter-B Scale for epidemiological research but have shown a dissatisfaction with existing cut off score. Thus a need was perceived to test the applicability of a known scale i.e. Rutter-B Scale for completion by teachers for epidemiological studies of children in India.

The present study was planned to study sensitivity and specificity of Rutter-B Scale in epidemiological research in Indian setting and to determine the accuracy of teachers' and parents' report in picking up psychiatric disorder in children.

MATERIAL AND METHOD

This study is a part of a large epidemiological study that was funded by Indian Council of Medical Research. This study involved taking a stratified random sample of school children in the city of Chandigarh (U.T.) in the age range of 4-11 years. The sample was studied on a multistage method, using multiple informant and stratified random sampling procedure. Stratification was done on parameters of age, sex and socio-economic status.

Sample: A list of all the schools (N=175) in Chandigarh city and adjoining villages included in the Union Territory of Chandigarh was obtained. This comprised of 3 categories of schools viz. govt. schools of Chandigarh Administration (94), govt. recognised and aided schools (46), and private schools (35). These three categories broadly are attended by children from a particular social class and by and large represented the three socio-economic classes in the community i.e. lower, middle and upper respectively. Schools were also categorised into those exclusively for boys or girls or co-education. 5 private schools, 7 government schools and 7 government aided schools were chosen by random numbers taking equal numbers of schools exclusively for boys or for girls to obtain equal sex ratio. Principals of the schools chosen for inclusion were contacted for permission to undertake the study. District Education Officer for U.T. Chandigarh was approached for permission to work in the government schools. Principals of three private schools refused permission. One government aided school could not be located since it has been closed down. Thus the study was done on 2 private schools, (one for boys and one for girls); 6 government aided schools and 7 government schools, all co-educational (total 15). A list of all the children in classes nursery to VI which expected to include children aged 4-11 years was obtained. 20% of the total children were selected by random numbers.

Inclusion criteria: i) age 4-11 years & ii) teacher should have known the child for at least 6 months.
Exclusion criteria: i) children outside the specified age range; ii) class teacher did not know the child for at least 6 months; iii) whose names were in the registers but had left the school or the catchment area and iv) children who were destitute or homeless and lived in institutions.

1060 children were selected by random numbers out of which 97 failed the selection criteria and were excluded. There was no child who did not have a family. 963 children were included in the study. This study was conducted in three stages, details of which are shown in the flow-chart.

Stage I: Comprised of teacher’s assessment of child’s behaviour in the classroom using Rutter-B Scale for completion by teachers. For children 4 & 5 years, pre-school behaviour checklist (Richman et al., 1982) was chosen. Both the scales were translated into English by two colleagues, independently, who were not involved in the translation earlier, matching with original translation after due modification if necessary.

Both these scales have been extensively used in studies abroad and in India. However, norms and cut-off points have not been tested on Indian population. Children aged 4-5 years in the first two schools studied (n=53) were administered both the scales i.e. Rutter-B Scale and Pre-School Behaviour Checklist and there was 95% concordance between children scoring above the cut-off point. Thus, for the sake of comparability of results Rutter-B Scale was used for all the children.

All the children scoring 9 and above were considered positive at Stage I and were assessed in detail in Child & Adolescent Psychiatry (CAP) clinic of Postgraduate Institute of Medical Education and Research (stage-III). 963 children were assessed at stage I.

Stage II: Parents of all the children seen at stage I were contacted at their respective homes and the purpose of visit was explained to them. The mothers were interviewed on Childhood Psychopathology Measurement Schedule (CPMS) and other instruments to measure temperament, parental handling and life events by a team of a psychiatrist and psychologist. CPMS is an Indian adaptation of Achenbach’s Child Behaviour Checklist (CBCL) (1983). It is a bilingual (hindi & English) semi-structured interview schedule yielding a list of 75 symptoms, standardised on Indian children with satisfactory reliability and validity (Malhotra et al., 1988). All those cases who scored 10 or above on CPMS indicated possibility for psychiatric disorder and were clinically assessed in detail in the CAP clinic of PGIMER (stage-III). Information was also obtained on the education, occupation and income of the father and of the mother which was converted into socio-economic status categories as proposed by Gupta and Sethi (1978). The income categories in Gupta and Sethi’s Scale were duly modified in accordance with wage revisions effective in the government sector jobs and the commensurate non-government
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occupations since their study.

Socio-economic status was computed on the basis of weighted scores given for family income, education and occupation of the head of household. Five categories are generated i.e. SES I through V representing upper, upper-middle, middle, lower middle and lower classes respectively. 90 children could not be assessed for stage II for various reasons and one parent did not consent for the interview. Thus 873 parents were interviewed. Completion of each interview took one and a half to two hours.

State-III: All the children identified as positive on Rutter-B Scale (stage I) and/or CPMS (stage II) were called with parents to the Child & Adolescent Psychiatry clinic of PGIMER. All these cases were evaluated in detail by a psychiatrist for psychiatric illness taking a full clinical history from parents and mental status examination and were seen by the consultant incharge (SM). IQ testing was done using Malin's Intelligence Scale for Indian Children (MISC) for children above 6 years and Vineland's Social Maturity Scale (VSMS) and Gessel's drawing test for children aged 4-5 years. Clinical diagnosis was made according to ICD-10 by two psychiatrists independently, one of whom was essentially blind to the earlier ratings.

From the children who scored less than the cut off point on Rutter-B Scale and also on CPMS, 10% (n=82) were randomly selected, of whom 76 cooperated and were subjected to full stage-III assessment procedure to pickup the false negative cases.

RESULTS

963 children were included in the study at stage-I. Out of these, 90 children dropped out at stage-II of parental assessment. Hence, total number of children in the study was taken as 873. Table 1 shows the sample characteristics.

At stage-I, 96 (10.17%) out of 963 children were positive on Rutter-B. Out of 98, positive 2 dropped out. At stage-II, out of 873 children assessed, 72 (8.24%) scored above cut off on CPMS. Total 144 children who scored above cut off on Rutter-B and/or CPMS were assessed in detail at stage-III (flow-chart). Out of which 65 (7.44%) had psychiatric disorder.

In clinically disordered children correlation between Rutter-B and CPMS scores was not significant. Concordance between assessment at stage I and II i.e. between teacher’s report and parent’s report with clinical disorder is shown in table 2. Out of 96 children positive at stage I only 34.4% were positive at stage III or had psychiatric disorder. Out of 72 positive children at stage II, 66.7% had psychiatric disorder. Out of 24 children who were positive at both stage I & II or scored above cut off on Rutter-B Scale and CPMS, only 16 (66.7%) had psychiatric disorder.

TABLE 1
SAMPLE CHARACTERISTICS

| Total Sample | N | % |
|-------------|---|---|
| Age
| 4.5 | 182 | 20.8 |
| 6.7 | 242 | 27.7 |
| 8.9 | 231 | 26.5 |
| 10.11 | 218 | 25.0 |
| Sex
| Male | 421 | 48.2 |
| Female | 452 | 51.8 |
| School
| Government | 382 | 43.8 |
| Govt. Recognised | 228 | 26.1 |
| Private | 263 | 30.1 |
| SES
| Upper Middle | 191 | 21.9 |
| Middle | 180 | 20.6 |
| Lower Middle | 336 | 38.5 |
| Very Low | 166 | 19.0 |

TABLE 2
CONCORDANCE BETWEEN ASSESSMENT AT STAGE I & II WITH STAGE III

| Positive at | n | Positive at stage III |
|-------------|---|----------------------|
| Stage I | 96* | 33 (33.6%) |
| Stage II | 72 | 48 (66.7%) |
| Stage I & II | 24 | 16 (66.7%) |
| Total | 144 | 65 (45.1%) |

* 2 Children drop out after stage I assessment.

Correlation between Rutter-B & CPMS in clinically disordered children-0.211 (N.S.)
An attempt was made to find out the specificity and sensitivity at various cut-off scores on Rutter-B Scale (table 3). At different cut-off scores, specificity was calculated by taking the percentage of clinically disordered children out of those scoring above the cut off. Sensitivity is the percentage of clinically disordered out of total number of clinically disordered children (n=65). At existing cut-off score of 9, specificity was 34.1% and sensitivity was 51.8%. When cut-off score was taken as 11, specificity increased to 43.4% but sensitivity decreased to 38.5%. At cut-off score of 12, specificity further increased to 44.2% and sensitivity decreased to 35.4%.

**TABLE 3**

| Cut off scores | N above cut off | Clinical disorder | Specificity | Sensitivity |
|----------------|----------------|-------------------|-------------|-------------|
| 9              | 96             | 33                | 34.1%       | 51.8%       |
| 11             | 53             | 23                | 43.4%       | 38.5%       |
| 12             | 43             | 19                | 44.2%       | 35.4%       |

**DISCUSSION**

Rutter-B Scale has been extensively used as a screening instrument in epidemiological studies. It is a useful tool for screening as it is simple, not very lengthy, can be self-administered and covers most aspects of behavioural problems manifested in school. No training is required for its use. This scale has been found useful as a screening instrument in two stage procedures in which assessment of parents and interview with child is added in next stage. This scale was not developed to be used as a diagnostic instrument.

Various epidemiological studies have shown that even when Rutter-B was used as screening instrument, its sensitivity and specificity was found to be low (Fombonne, 1994; Devasagamani, 1990; Banerjee, 1997). In order to arrive at a diagnosis, parent's ratings of children's behaviour have been added.

In epidemiological studies of children scoring above cut-off on Rutter-B varied i.e. 7% in Isle of Wight study (Rutter et al., 1970). 17.1% (Kolvin et al., 1977). 3% from Japan (Matsura et al., 1989), and 28.6% in Chartres study (Fombonne, 1994). While using Rutter-B for specific groups, it was reported that 27% of children who were low birth weight infants scored above cut-off (Pharoah et al., 1994); in homeless children this rate was 49% (Amrey et al., 1995). Dissatisfaction with existing cut-off scores has been reported from India as well as UK (Banerjee, 1997; Kolvin et al., 1977). In present study 10.17% children were positive on Rutter-B. Out of which only 1/3rd had psychiatric disorder, which shows 34.1% specificity. When an attempt was made to raise cut-off score specificity increased but sensitivity decreased.

In the present study parent's assessment had higher concordance with clinical disorder. Out of 72 children positive at stage II i.e. parent's assessment, 66.7% had clinical disorder. A number of studies have shown that parents tend to report higher level of problems in children than teachers (McGee et al., 1983; Touliatos & Lindholm, 1981; Verhulst & Akkerhuis, 1989; Gagnon et al., 1992) and that parent's report is a better indicator of psychiatric disorder in children (Gagnon et al., 1992).

Correlation between teachers and parents assessment in clinically disordered children was -.211 in the present study. Similar correlation values of 0.21 to 0.27 between parents and teachers report have been reported in various other studies (Gagnon et al., 1992; Achenbach et al., 1987; Fombonne, 1994). This indicates that Rutter-B measures different spectrum of problems and these have little overlap with those reported by parents.

In this study, the percentage of children scoring above the cut-off as reported by parents (8.24%) and teachers (10.17%) were not very different but the rates of actual disorder among these was significantly different 66.7% by parent rating and 33.6% by teacher rating (table 2). Out of those in whom both Rutter-B and CPMS gave higher than cut-off rating, 66.7% had disorder. This shows that CPMS has much better specificity than Rutter-B Scale and that rating of Rutter-B Scale did not enhance the specificity. Exercise in raising the cut-off score of Rutter-B
led to marginal gains in specificity but loss in sensitivity. Therefore, altering the cut-off score of Rutter-B scale is not likely to increase its usefulness in our setting. It can be concluded from the present study that Rutter-B is not a sufficient measure of disorder in epidemiological surveys, parent’s assessment is essential for diagnosing clinical disorder. Specificity of Rutter-B Scale can be enhanced not by raising the cut off score but by adding other measures of disability and dysfunction. There is a need for modification followed by standardisation of Rutter-B Scale on Indian population before use.

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REFERENCES

Achenbach,T.M., McConaughy,S.H. & Howe,k.C.T. (1987) Child/Adolescent behavioural and emotional problems : implications of cross informant correlation for situational specificity. Psychological Bulletin, 102, 213-232.

Amrey,J., Tomkins,A. & Victor,C. (1995) The prevalence of behavioural problems amongst homeless primary school children in an outer London Borough : A feasibility study. Public Health, 109, 421-424.

Banerjee,T.(1997) Psychiatric morbidity among rural primary school children in West Bengal. Indian Journal of Psychiatry, 39, 130-135.

Deivasigamani,T.R. (1990) Psychiatric morbidity in primary school children - an epidemiological study. Indian Journal of Psychiatry, 32, 3, 235-240.

Fombonne,E. (1994) The Chartres Study. Prevalence of psychiatric disorders among French school-aged children. British Journal of Psychiatry, 164, 69-79.

Gagnon,C., Vitaro,F. & Tremblay,R.E. (1992) Parent, teacher agreement on Kindergarteners’ behaviour problems : a research note. J. Child Psychology & Psychiatry, 33, 1255-1261.

Gupta, S.C. & Sethi, B.B. (1978) Development of socioeconomic scale for urban population. Indina Journal of Psychiatry, 20, 2, 115-120.

Kolvin,!., Garside,R.F., Nicol,A.R., Leitch,l. & Macmillan.A. (1977) Screening school children for high risk of emotional and educational disorder. British Journal of Psychiatry, 131, 192-206.

Malhotra,S. & Kohli,A. (1995) Study of psychosocial determinants of developmental psychopathology in school children. ICMR project report.

Malhotra,S. & Malhotra,A. (1988) Manual for Malhotra’s Temperament Schedule, Pub. National Psychological Corp. Agra.

Malhotra,S., Varma,V.K., Verma,S.K. & Malhotra,A. (1988) Childhood Psychopathology Measurement Schedule : Development and Standardisation. Indian Journal of Psychiatry, 30, 2, 168-172.

Malin,A.J. (1970) Vineland Social Maturity Scale (Indian Adaptation) Lucknow : Indian Psychological Corporation.

Malin,A.J. (1971) Malin’s intelligence scale for Indian children. Indian Journal of Mental Retardation, 4, 15-25.

Matsura, Obuko, Y. & Kato,M. (1989) An epidemiological investigation of emotional and behavioural problem in primary school children in Japan. Social Psychiatry and Psychiatric...
McGee, R., Silva, P.A. & Williams, S. (1983) Parents’ and teachers’ perceptions of behaviour problems in seven years old children. *The Exceptional Child*, 30, 151-161.

Parvathavardhini (1983) Psychosocial problems amongst rural children: an epidemiological study. Unpublished M.Phil. dissertation, Bangalore University.

Pharoah, P.O., Stevenson, C.J., Cooke, R.W. & Stevenson, R.C. (1994) Prevalence of behaviour disorder in low birth weight infants. *Arch. Dis. Children*, 70, 4, 271-274.

Richman, N., Stevenson, J.E. & Graham, P.J. (1982) Pre-school to school: a behavioural study. London: Academic Press.

Rutter, M. (1967) A children’s behaviour questionnaire for completion by teachers: preliminary findings. *J. Child Psychol. Psychiatry*, 8, 1-11.

Touliatos, J. & Lindholm, B.W. (1981) Congruence of parents’ and teachers’ ratings of children’s behaviour problems. *Journal of Abnormal Child Psychology*, 9, 347-354.

Verhulst, F.C. & Akkerhuis, G.W. (1989) Agreement between parents’ and teachers’ ratings of behavioural/emotional problems of children aged 4-12. *Journal of Child Psychology & Psychiatry*, 30, 123-136.

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