Epidemiology of child mental health problems in Gaza Strip

A.A. Mousa Thabet[1] and P. Vostanis[2]

وبائيات المشكلات الصحية النفسية في قطاع غزة

عبد العزيز موسى ثابت، وبانوس فوستانيس

خلاصة: استهدفت هذه الدراسة كشف انتشار المشكلات الانفعالية والسلوكية بين الأطفال الفلسطينيين، وقد شملت الدراسة 959 طفلاً من قطاع غزة، منهم 453 فتى و506 فتاة. وقد تراوحت أعمارهم بين 6 و12 سنة، وكان متوسط العمر لديهم 8.81 سنة. وقد قام المعلمون بملء سلم قياس روتر ب2. وقد أوضحت النتائج أن عدد الحالات بين الفتيان 247 بمعدل وقوع 54.5 % وعدد الحالات بين الفتيات 215 حالة بمعدل وقوع 46 %. وكانت الفوارق بين معدلي الوقوع في الذكور والإناث فوارق يُعتدّ بها إحصائياً، إذ صنف المعلمون الأطفال الذكور على أن شدة الحالات لديهم أكثر بشكل يُعتدّ به إحصائياً، حيث صنَّفوا 48 % من الأطفال على أنهم فوق مستوى الفيصل 9. إن تحليل عوامل سلم القياس أظهرت وجود العوامل الثلاثة التالية: السلوك المعادي للمجتمع والعدوانية، القلق والخوف، ورُهاب المدرسة.

ABSTRACT The aim of this study was to detect the prevalence of behavioural and emotional problems among Palestinian children. The study enrolled 959 children from the Gaza Strip, 453 boys and 506 girls. Ages ranged from 6 to 12 years, with a mean of 8.81 years. Teachers completed the Rutter scale B2. The results showed that the case incidence in boys was 247 (54.5%), while in girls it was 215 (46.5%). The differences between boys and girls were statistically significant, with boys rated by teachers with a significantly higher caseness. The teachers rated 48% of the children as at or above the cut-off level of 9. Factor analysis of the scale revealed the following three factors: antisocial behaviour–aggression, anxiety–fearfulness, and school phobia.

Epidémiologie des problèmes de santé mentale chez les enfants dans la Bande de Gaza

RESUME Cette étude avait pour objectif de détecter la prévalence des problèmes comportementaux et émotionnels chez des enfants palestiniens. Neuf cent cinquante-neuf (959) enfants de la Bande de Gaza – 453 garçons et 506 filles – ont participé à l'étude. Les âges étaient compris entre 6 et 12 ans, la moyenne étant de 8,81 ans. Les enseignants ont complété l'échelle B2 de Rutter. Les résultats ont montré que l'incidence des cas chez les garçons s'élevait à 247 (54,5 %), tandis que chez les filles, l'incidence était de 215 (46,5 %). Les différences entre les garçons et les filles étaient statistiquement significatives, les garçons étant classés par les enseignants parmi les enfants ayant le plus grand nombre de cas. Les enseignants ont classé 48 % des enfants comme étant au niveau seuil de 9 ou le dépassant. L'analyse factorielle de l'échelle a mis en évidence les trois facteurs suivants : comportement antisocial agression, anxiété-crainte, phobie scolaire.

[1]*School of Public Health, Al-Quds University, Gaza, Palestine.*
[2]*Greenwood Institute of Child Health, University of Leicester, Leicester, United Kingdom.*

Introduction

The population of Gaza Strip was estimated at 389 000 in 1967. By 1997 it was estimated to have increased to 1 000 175 [*1*]. The population density of Gaza Strip is high at 3 000 people per square kilometre. Refugees make up 62.6% of the general population, and of these about 55.1% live in crowded camps. The remaining 44.9% live outside the camps in villages and towns. The population pyramid in Gaza Strip has a wide base, with 50.8% of the population under 15 years of age. The apex is narrow and low due to the short life expectancy: only 3.4% of the population is over 64 years of age. In 1997, the infant birth rate was 37.3 per thousand, the infant mortality rate was 20.1 per thousand, while for children under 5 years, the mortality rate was 25.5 per thousand and the crude death rate 3.5 per thousand. Respiratory diseases and accidents were the major causes of morbidity in children. The annual increase of population growth in 1997 in Gaza Strip was 3.4% [*1*].

The aim of our study was to investigate the prevalence of behavioural and emotional problems among Palestinian children in Gaza Strip. The measures available as screening instruments for epidemiological studies of emotional and behavioural disorders have been reviewed in two major works [*2,3*]. Boyle and Jones identified several features to be considered in the choice of an instrument: acceptability, applicability, procedural adequacy, reliability and validity [*2*]. In their review of seven scales measuring general psychopathology they concluded that the instruments developed by Rutter, Achenbach and Quay were the most promising for use in the general population. These include the teacher and parental questionnaires designed by Rutter [*4*] and by Achenbach [*5*]. Rutter questionnaires have been used in many studies [*6,7*].

A number of precautions have been taken to ensure that screening instruments are valid and efficient indicators of psychiatric disorder [*6,8*]. The Arabic version of Rutter's parental scale has been used before in our society [*9,10*].

Methods

Sample

School students from the first to the sixth grade, ranging in age from 6 to 12 years, who were enrolled in either public, private or United Nations Relief and Work Agency for Palestine (UNRWA) schools, were selected as the target population for this study (n = 125 591) (Annual Report of the Ministry of Education 1995–1996). A multistage cluster sampling technique was used. The sampling stages are summarized as follows:

- Phase 1. Gaza Strip was stratified into five districts: north of Gaza, Gaza city and the camp, Midzone, Khan Younis and Rafah.
- Phase II. A total of 300 schools were selected using a probability proportional to the estimated size technique.
- Phase III. Secondary sampling units were selected at the district level from each type of school (government, private or UNRWA) selected in phase II.
- Phase IV. A minimum of 10 students was randomly selected from each cluster using systematic sampling and according to a written protocol.

As this was a probability sample, the use of different statistics at the correct level of significance requires weighting the actual value obtained by a factor related to the original relative size of different strata.

Hence, our first check of the quality of our data was for the degree of compliance between actual relative strata size and school relative size (when relative sizes of different strata were calculated, we used estimated student population sizes). The total number of schools selected was 42 UNRWA, 53 government and 2 private schools. The total number of children studied was 959; 453 boys (47.2%) and 506 girls (52.8%). The minimum age was 6 years and the maximum age 12 years (mean = 8.81 years, standard deviation = 1.8).

Instruments

Rutter Scale for completion by teachers B2

This scale consists of 26 brief statements concerning the child's behaviour [8]. The teacher chooses one of three statements (definitely applies, applies somewhat or does not apply) for each item. These are given a weight of 2, 1 and 0 respectively to produce a total score with a range of 0 52 by summation of the scores of the 26 items. A "neurotic" subscore is obtained by adding the scores of items 7, 10, 17 and 23 (often worried, worries about many things; often appears miserable, unhappy, tearful or distressed; tends to be fearful or afraid of new things or new situations; has had tears on arrival at school or has refused to come into the building this year). An "antisocial" subscore is obtained by adding the scores of items 4, 5, 15, 19, 20 and 26 (often destroys own or others' belongings; fights moderately with other children; is often disobedient; often tells lies; has stolen things on one or more occasions; bullies other children).

The selection of children with possible emotional or behavioural disorders by means of the scale is a two-stage procedure. First, children with a total score of 9 or more (boys or girls) are designated as showing some disorder. Second, of these children, those with a emotional score exceeding the behavioural score are designated neurotic, and those with a conduct score exceeding the emotional score are designated conduct disorder. Children with equal emotional and behavioural subscores remain undifferentiated.

Reliability of the Rutter teacher's scale B2 (Arabized version)

The split-half reliability of the scale was high ($r = 0.84$). Internal consistency of the subscales, calculated using Chronbach alpha, was also high (alpha = 0.91). A correlation of 0.44 ($P < 0.000$) between aggression and neurotic subscale scores, 0.18 ($P < 0.000$) between neurotic and hyperactivity subscale scores, and 0.82 ($P < 0.000$) between aggression and hyperactivity subscale scores indicated that the three subscales were associated but did not measure identical dimensions.

A test retest was also conducted for the scale which included 91 children's teachers selected randomly from the sample. The Rutter teacher's scale was distributed to the teachers and 1 month later the same procedure was repeated. The *t*-test paired samples correlation coefficients for the total scale score between the two periods was ($t = 0.69$, $P < 0.000$).

Translation and back-translation of Rutter teacher's scale B2

The questionnaire was translated into Arabic by the principle investigator, part of whose psychiatric training in the United Kingdom was at the Institute of Psychiatry with Professor Rutter's team. A graduate with a degree in English and a diploma in translation, working as a primary-school teacher, back-translated the questionnaire into English. This provided a check on the

clinical specificity of the questionnaire. Back-translation from Arabic to English revealed minor differences in the following items:

- Item no 3: squirmy, fidgety child was back-translated to always nervous and moves a lot.
- Item no 6: not liked back-translated to not loved.
- Item no 7: often worried, worries about many things back-translated to child's mind is busy with many things.
- Item no 9: irritable back-translated to tense and easily agitated.
- Item no 11: has twitches, mannerisms or tics of the face or body back-translated to complains of quivers or repeated movements in face or body.
- Item no 16: cannot settle to anything for more than a few moments back-translated to is unable to continue a task for some time.
- Item no 18: fussy or over-particular back-translated to ungovernable and not easy to satisfy.
- Item no 21: unresponsive, inert or apathetic back-translated to sluggish and dull.
- Item no 25: resentful or aggressive when corrected back-translated to violent and harsh when attempts made at reform.
- Item no 26: bullies other children back-translated to teases other children.

The Rutter Scale B2 for completion by teachers was distributed to teachers of randomly selected classes covering the entire Gaza Strip. The response to the questionnaires was very high (98%). The number of children screened according to the original sample was 981, but 22 questionnaires were incorrectly completed or not returned, thus leaving 959 children studied. The "caseness" rates were calculated using a cut-off score of 9 for the teacher's questionnaire [5].

Results

The case frequency ranged from 0 to 43. Caseness of boys was 247/453 (54.5%), and of girls 215/506 (42.5%). The difference between boys and girls was statistically significant ($\chi_1^2 = 13.8$, $P < 0.001$) (Table 1).

Frequency of behavioural items

Bullying was the most frequently reported abnormal behaviour; boys were more likely to be affected than girls (16.6% versus 9.5%) (Table 2). The difference between the sexes was statistically significant ($\chi_2^2 = 43.6$, $P < 0.001$). Lying was the next most frequent abnormal behaviour, and

Table 1 **Distribution of caseness according to ratings on the Rutter teacher's scale B2**

Caseness	Boys		Girls		χ_1^2
	No.	%	No.	%	
Selected caseness	247	25.8	215	22.4	13.8[a]
Non-selected caseness	206	21.5	292	30.4	

[a] $P < 0.001$.

again boys were more likely to be affected (14.3% versus 9.9%), a statistically significant difference ($\chi_2^2 = 12.9$, $P < 0.01$). Disobedience was the third most common abnormal behaviour; 11.9% of boys and 9.5% of girls ($\chi_2^2 = 14.6$, $P < 0.01$).

Frequency of emotional items

The most frequently reported abnormal emotional item was worrying: 21.4% of boys versus 17.4% of girls ($\chi_2^2 = 11.5$, $P < 0.01$) (Table 2). On the other hand, 15.0% of boys were considered fearful compared to 18.4% of girls ($\chi_2^2 = 1.9$, $P < 0.37$). Feeling miserable was the third most common abnormal emotional item: 11.3% of boys versus 12.8% of girls ($\chi_2^2 = 2.4$, $P < 0.24$).

Frequency of hyperactivity items

Restlessness was the most frequently reported abnormal hyperactivity item: 23.0% of boys versus 17.0% of girls ($\chi_2^2 = 9.7$, $P < 0.01$). Poor concentration was the next item: 15.5% of boys versus 13.2% of girls ($\chi_2^2 = 6.4$, $P < 0.05$). Having a tendency to fidget and squirm was more common in boys: 18.3% versus 8.7% ($\chi_2^2 = 51.0$, $P < 0.01$).

Total scores

Boys and girls were compared in terms of total score by the Mann–Whitney test. This rated boys significantly higher than girls on the total Rutter B2 (Mann–Whitney z-score = –4.6, $P < 0.000$). Similarly, the Mann–Whitney test was used to compare boys and girls on each of the following subscale scores.

- The mean score of aggression items was 2.7 (standard deviation = 2.42), and boys were significantly more aggressive than girls ($z = -6.4$, $P < 0.000$).
- The mean score of neurotic items was 1.8 (standard deviation = 2.09); there was no sex difference on the neurotic subscale score ($z = -1.6$, $P < 0.10$).
- The mean score of hyperactivity items was 1.8 (standard deviation = 1.82). There was a statistically significant difference between the sexes, with boys being significantly more hyperactive than girls ($z = -5.2$, $P < 0.000$).

Relationships between subscores of subscales of the Rutter questionnaire

Internal associations between the three derived subscales (Pearson product-moment correlation) were identified.[2] The aggression scores were strongly correlated with the hyperactivity scores ($r = 0.82$, $n = 958$, $P = 0.000$), and were also strongly correlated with the neurotic scores ($r = 0.44$, $n = 958$, $P = 0.000$). The hyperactivity scores were strongly correlated with the neurotic scores ($r = 0.48$, $n = 958$, $P = 0.000$).

Factor analysis of Rutter teacher's scale B2

In order to examine the structure of the Rutter teacher's questionnaire, initial principal component factor analyses were performed after varimax rotation with Kaiser normalization of all data. The factor analysis of the 26 items yielded 3 factors with Eigen values greater than 1. The Eigen values after rotation were 8.77, 2.75 and 1.37. The three factors accounted for 49.9% of the variance (Table 3).

- Factor 1 loadings were fidgets (0.86), fights (0.82), bullies (0.81), is destructive (0.73), is restless (0.72), is resentful (0.72), lies (0.62), steals (0.61), is disobedient (0.59), is not liked (0.53), and is fussy (0.52).
- Factor 2 loadings were: apathetic (0.72), fearful (0.65), cries at school (0.64), is miserable (0.62), is solitary

Table 2 Item distribution for boys and girls on the Rutter teacher's scale B, stage one ($n = 959$)

Item	Boys ($n = 453$)						Girls ($n = 506$)						χ^2_2
	Does not apply		Applies somewhat		Definitely applies		Does not apply		Applies somewhat		Definitely applies		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Restless	215	47.5	134	29.6	104	23.0	289	57.1	131	25.9	86	17.0	9.7**
Truant	368	81.2	55	12.1	30	6.6	469	92.7	29	5.7	8	1.6	30.1***
Fidgets	226	49.9	144	31.8	83	18.3	365	72.1	97	19.2	44	8.7	51.0***
Destructive	296	65.3	110	24.3	47	10.4	386	76.3	80	15.8	40	7.9	14.2**
Fights	277	61.1	122	26.9	54	11.9	401	79.2	77	15.2	28	5.5	36.2***
Not liked	295	65.1	121	26.7	37	8.2	340	67.2	124	24.5	42	8.3	0.61
Worries	147	32.5	209	46.1	97	21.4	218	43.1	200	39.5	88	17.4	11.5**
Solitary	278	61.4	117	25.8	58	12.8	337	66.6	111	21.9	58	11.5	2.8
Irritable	305	67.3	100	22.1	48	10.6	367	72.5	100	19.8	39	7.7	3.7
Miserable	278	61.4	124	27.4	51	11.3	324	64.0	117	23.1	65	12.8	2.4
Twitches	368	81.2	60	13.2	24	5.3	425	84.0	60	11.9	40	7.9	1.2
Sucks thumb	381	84.1	49	10.8	23	5.1	440	87.0	49	9.7	17	3.4	2.2
Bites nails	349	77.0	79	17.4	25	5.5	404	79.8	76	15.0	26	5.1	1.1
Absence from school	344	75.9	73	16.1	36	7.9	403	79.6	66	13.0	37	7.3	2.1
Disobedient	257	56.7	141	31.1	54	11.9	347	68.6	111	21.9	48	9.5	14.6**
Poor concentration	210	46.4	173	38.2	70	15.5	276	54.6	163	32.2	67	13.2	6.4*
Fearful	217	47.9	168	37.1	68	15.0	235	46.4	178	35.2	93	18.4	1.9
Fussy	281	62.0	130	28.7	42	9.3	367	72.5	113	22.3	26	5.1	13.4**
Lies	250	55.2	138	30.5	65	14.3	336	66.4	120	23.7	50	9.9	12.9**
Steals	380	83.9	44	9.7	29	6.4	450	88.9	37	7.3	19	3.8	5.6*
Apathetic	250	55.2	123	27.2	80	17.7	300	59.3	119	23.5	87	17.2	1.9
Aches/pains	362	79.9	77	17.0	14	3.1	400	79.1	82	16.2	23	4.6	1.4
Cries at school	410	90.5	32	7.1	11	2.4	479	94.7	19	3.8	8	1.6	6.2*
Stutters	311	68.7	110	24.3	32	7.1	381	75.3	86	17.0	39	7.7	7.8*
Resentful	326	72.0	92	20.3	35	7.7	425	84.0	56	11.1	25	4.9	20.6***
Bullies	237	52.3	141	31.1	75	16.6	369	72.9	89	17.6	48	9.5	43.6***

Distributions show significant sex differences: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

(0.62), has poor concentration (0.61) and worries (0.56).

Factor 3 loadings were: truancy from school (0.74), absence from school (0.68) and cries on arriving at school (0.64).

In order to obtain a more comprehensive view of the prediction of caseness by the Rutter teacher's scale as dependent variable by various demographic variables (sex, age, place of residence and type of school) as independent variables, sequential logistic regression analysis was performed with each of the independent variables. Finally multiple regression analysis was performed using only the significant independent variables. Caseness by teachers was found to be best predicted by place of residence ($B = -0.15$, $P < 0.000$), being a boy ($B = -0.42$, $P < 0.00$) and type of school ($B = -0.47$, $P < 0.00$).

Table 3 **Results of principal component factor analysis followed by varimax rotation of the overall data of the Rutter teacher's questionnaire**

Factor	Loadings	Eigen value	%
Factor I		8.77	33.8
Fidgets	0.86		
Fights	0.82		
Bullies	0.81		
Destructive	0.73		
Restless	0.72		
Resentful	0.72		
Lies	0.62		
Steals	0.61		
Disobedient	0.59		
Not liked	0.53		
Fussy	0.52		
Factor II		2.75	10.6
Apathetic	0.72		
Fearful	0.65		
Cries at school	0.64		
Miserable	0.62		
Solitary	0.62		
Poor concentration	0.61		
Worries	0.56		
Factor III		1.37	5.3
Truancy	0.74		
Absence from school	0.68		
Cries on arrival	0.64		

Discussion

Table 4 shows the prevalence rates of psychiatric disorders in childen reported in various studies using the Rutter classification.

In a study of schoolchildren (average age 10 years) in the small-town setting of the Isle of Wight, Rutter et al. showed that 6.8% of the children scored 13+ on the parent-completed scales [*6*]. Their scores were well below those found in a mentally disordered sample attending a psychiatric clinic, where 54.5% scored above the 13+ cut-off point. In a sample of inner London Anglo-Saxon children, 41.3% scored above the cut-off point [*11*] as did 34% of children of West Indian origin from the same London borough [*12,13*]. In his study of the children of victims of political persecution and torture using the Rutter scale, Allodi found a prevalence of mental disorder of 70% [*14*]. Eapen et al. found that 23.9% of schoolchildren in the United Arab Emirates were reported to have mental health problems by either the parent or the school health physician [*15*].

In our study, the prevalence of psychiatric morbidity as rated by teachers was higher than in these previous studies (48% above cut-off point) except for the 70% reported by Allodi [*14*]. Our findings that somatization problems are less prevalent than found by other studies performed in

Table 4 **Prevalence of psychiatric disorders in children and adolescents in community studies using the Rutter classification**

Investigator	Year of study	Age (years)	Sample size	Prevalence rate (%)
Rutter et al.	1970	10–11	2199	8.6
Graham and Rutter	1973	14–15	2303	21.0
Miller et al.	1974	10	794	19.4
Rutter et al.	1975 (ILB)	10	1689	25.4
Rutter et al.	1975 (IOW)	10	1279	12.0
Connell et al.	1982	10–11	779	14.1
Vikan	1985	10	1977	5.0
Offord et al.	1987	4–16	2679	18.1
Andreson et al.	1987	11	925	17.6
Esser et al.	1990	8	1444	48.0
Jeffers et al.	1991	10–11	2029	24.5
Fombonne	1994	6–12	2158	26.8
Eapen et al. [*15*]	1998	6–15	3278	23.9

Source for studies up to 1994: Bird HR et al. Epidemiology of childhood disorders in a cross-cultural context. Journal of child psychology and psychiatry, *1996, 37:35–49.*
ILB = inner-London borough.
IOW = Isle of Wight.

the Middle East could be due the scale used for evaluation of children by teachers. The Rutter teacher's scale does not include many questions about somatic symptoms, such as bronchial asthma, headaches, or body pain. Nevertheless, the finding of a high rate of mental problems must highlight the importance of training teachers in the areas of child mental health, class management and prevention of child psychiatric disturbances.

The use of the Rutter scale in this population may be extended to the hyperactivity subscales and incorporate items about desirable behaviour. However, in both cases it is not yet clear what the net benefit would be of including additional items, since the brevity and simplicity of the scales are among their major positive features.

In our study, the Rutter teacher's scale items loaded mainly on three factors.

The first factor consisted of the antisocial–hyperactive items including destructiveness, fighting, lying, bullying, being fussy, fidgeting, resentfulness, stealing, restlessness, disobedience, and not being liked. This factor is similar to one identified by Venables et al. [*16*] and Fowler and Park [*17*] and is characterized by aggression and hyperactivity. However, Schachar, Rutter and Smith, in a reanalysis of the original Isle of Wight data, found that a hyperkinetic factor emerged separately from aggression in a series of principle component analyses [*18*]. The hyperkinetic factor was made up of the items: restlessness, fidgeting, and inability to settle/poor concentration. McGee et al. identified three factors,

aggressiveness, hyperactivity and anxiety–fearfulness [*19*]. In a study of Japanese children, Morita et al. identified a factor consisting of antisocial items such as destructiveness, fighting, lying, bullying, being fussy, irritability and not being liked [*20*].

The second factor loaded on the anxiety–fearfulness items such as apathy, fearfulness, being miserable, being solitary, poor concentration, and having worries. This is similar to the second factor reported by Venables et al. [*16*] as an anxious–fearful factor. Fowler and Park [*17*] found a similar anxious–fearful factor, as did Behar and Stringfield [*21*].

The third factor included the three items truancy, absenteeism from school and crying at school. This factor is similar to a factor found by Morita et al. [*20*], which they called absenteeism.

These three factors differ from the original Rutter et al. [*6*] factors of being antisocial, hyperactive and having emotional problems.

One limitation of our study was that possible mediating factors, such as family functioning, parenting capacity, and social and peer relationships were not included. The Rutter scale, which was used for screening, describes general mental health problems and does not focus on specific stress-related problems. Furthermore, we did not use structured psychiatric interviews with the children: their general mental health problems were rated by adult informants (teachers).

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