Chapter 3

Prevalence and correlates of psychopathology in a sample of deaf adolescents

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Abstract

Aims: To examine prevalence and correlates of psychopathology in deaf adolescents using a multi-method multi-informant approach. **Methods**: Data for the study came from checklist assessments by parents (CBCL) and teachers (TRF) of 70 deaf adolescents aged 13 to 21 years, from semi-structured clinical interviews of the adolescents (SCICA), and from expert ratings of dossier data. **Results**: The percentages of Total Problems scores in the borderline clinical range in this population as found with CBCL, TRF and SCICA are 28%, 32% and 49-63% respectively. Expert dossier ratings identified psychiatric caseness in 49% and DSM-classifications in 46% of the adolescents (primary classifications: emotional disorder 27%, behavioral disorder 11%, other disorder 7%). Cross-informant agreement between single ratings and expert dossier ratings was better than agreement between single ratings. Logistic regression analyses revealed that low IQ, a signing mode of communication and a history of three or more physical disorders were associated with psychiatric caseness. **Conclusions**: Findings suggest a high prevalence of psychopathology in the population studied and argue for a special focus on the early detection of significant emotional and behavioral problems as well as a multi-informant approach to the assessment of disorder in deaf children and adolescents. The correlational findings support the view that it is not deafness per se that contributes to psychiatric problems. **Keywords:** psychopathology, deaf, adolescents.

Introduction

In the past thirty-five years there have been more than twenty studies investigating the prevalence of general psychopathology in deaf and hard of hearing children and adolescents. Table 1 summarizes thirteen studies which meet the following inclusion criteria: 1. samples representing whole populations or school populations; 2. subjects below 22 years of age; 3. subjects with a roughly normal level of intelligence; 4. use of validated instruments for the assessment of psychopathology; and 5. prevalence rate reported as a percentage of the sample. The prevalence of psychopathology reported in these studies varies from 0% to 77%.

The results of the studies presented in Table 1 show that the choice of informants contributes to variations in reported prevalence. This underscores the need to use several informants. However, the level of agreement between parent, child and teacher is generally low and there is no generally accepted standard scheme for combining information from multiple informants (e.g., Fombonne, 2002). Instead, the strategy used in the Development and Well-Being Assessment (DAWBA; Goodman, Ford, Richards, Gatward & Meltzer, 2000), that is: bringing together data from multiple informants and weighing the relative contribution of informant specific information by clinicians, has been shown to be both reliable and valid (e.g., Goodman, Yude, Richards & Taylor, 1996).

The reported prevalence rates in the studies using the Rutter Scale completed by teachers (Rutter et al., 1970), vary from 0% to 54% (see Table 1), indicating that discrepancies may also be related to differences in the composition of the samples. The results of research into the correlates of psychopathology offer some insight into such potential differences. Studies with deaf children have shown higher prevalence rates of psychopathology in deaf children with brain pathology (e.g., Chess & Fernandez, 1980), additional physical handicaps (Sinkkonen, 1994) and intellectual impairment (Van Eldik, Treffers, Veerman, & Verhulst, 2004; Van Eldik, 2005). More discrepant findings have been reported with regard to directly deafness-related variables. Fundudis, Kolvin, and Garside (1979) found an association between psychopathology and the degree of hearing loss, others did not (e.g., Sinkkonen, 1994; Hindley et al, 1994). Specific etiological categories

Table 1.

Studies of the prevalence of mental health problems in hearing impaired (HI) children and adolescents

Study	Nature HI sample	HI sample: Number, age range, range[1] of HI	Methods of assessment[2]			Prevalence mental health problems		
			Child	Parent	Teacher	Measure	HI group	Hearing control or norm group
Rutter et al. 1970	Population	N=13; 5-14y; HI 2-4	I	I+R	R	Combined	15%	7%, control group N=2189
Freeman et al. 1975	Population	N=115; 5-15y; HI 3-4	O	I+R	R	Combined	23%	-
Fundudis et al. 1979	1. special school 2. HI unit	1. N=33; 7-10y; D 2. N=21;7-10y; H/H			R		1. 54% 2. 28%	18%, control group N=102
Aplin 1985	Special school	N=61; 7-15y; HI 1-4			R		36%	-
Aplin 1987	Ordinary school	N=42; 7-16y; HI 1-4			R		17%	-
Kammerer 1988	Special school	N=183; 10-13y; HI 1-4		I			54%	16%, norm group
Arnold and Atkins 1991	Ordinary school	N=23; 4-10y; H/H-D			R		0%	0%, control group N=23
Hindley et al. 1994	1. special school 2. HI unit	1. N=46; 11-16y; HI 3-4 2. N=35; 11-16y; HI 2-4	I	I+PCL	TCL	Combined	1: 33-42%[a] 2: 57-61%[a]	-
Sinkkonen 1994	Special school	1. N=203; 6-16y; D 2.N=91; 6-16y; H/H			R		1. 19% 2. 25%	16%, control group N=234
Mitchell and Quittner 1996	Special school	N=39; 6-14y; HI 3-4		CBCL	TRF	Separate	48% / 35%	-
Vostanis et al. 1997	Special school	N=84; 2-18y; HI 3-4		CBCL / PCL		Separate	43% / 77%	-
Van Eldik et al. 2004	Special school	N=238; 4-18y; HI 3-4		CBCL			41%	16%, norm group
Van Eldik 2005	Special & ordinary schools	N=110; 11-18y; HI 3-4	YSR				37%	17%, norm group

[1]: Hearing impairment: D= Deaf without further specification; H/H = Hard of Hearing without further specification; HI 1= Mild (20-40 dB); 2= Moderate (41-70 dB); 3= Severe (71-95 dB); 4 = Profound (>95 dB); [2]: Assessment methods: I= diagnostic interview; O= psychiatric observation; R= Rutter Scales (Rutter et al., 1970); PCL= Parent's Checklist and TCL= Teacher's Checklist (Hindley et al., 1994). [a]: adjusted minimum & maximum prevalence rates of borderline and definite psychiatric disorder.

of deafness, such as rubella, have been associated with an elevated prevalence of mental health problems in some studies (e.g., Trybus, Karchmer, Kerstetter, & Hicks, 1980) but not in others (e.g., Freeman et al., 1975). Furthermore some researchers found links with communication related factors (e.g., Vostanis, Hayes, Du Feu, & Warren, 1997), whereas others did not (Hindley et al. 1994). Finally, in some studies (Aplin, 1987; Arnold & Atkins, 1991; Van Eldik, 2005) relatively low levels of psychopathology were found among deaf children attending mainstream schools compared to special school populations of deaf children.

This study fills a number of gaps in the existing literature on the prevalence and correlates of psychopathology in deaf children and young people. To the best of our knowledge the present study is the first to make use of a diagnostic interview with all the participating children to assess psychopathology. In addition, the use of consensus expert ratings of psychiatric caseness and DSM-IV classification (American Psychiatric Association, 1994), bringing together information from parents, teacher, the adolescent and his/her medical record, is novel in this field. We hypothesized that the prevalence of scores in the borderline clinical range on symptoms rating scales by single informants would be increased compared to the prevalence of these scores in the Dutch hearing norm groups. We predicted that expert ratings would identify more adolescents with psychopathology than the single ratings. Finally, we investigated the associations between psychopathology and demographic, deafness and physical health related, cognitive and communication variables, as these associations might help to explain a higher prevalence of psychopathology among deaf and hard of hearing children. We expected to find differentiated associations between psychopathology and these variables.

Method

Participants

Participants were recruited from the total secondary school population of one of the three large organizations in the Netherlands that offer special education and educational counseling for deaf children and adolescents. Dutch law allows parents

and deaf children to choose between mainstream schools and special education. Deaf pupils in mainstreaming receive extra educational counseling. To attain a sample comparable with samples used in previous studies, adolescents receiving education for children with cognitive handicaps as well as adolescents receiving junior vocational education were excluded. As the educational organizations are very comparable, this sample may be regarded as representative of the population of deaf adolescents of normal intelligence in the Netherlands. However, it should be noted that oral communication (speech and speech reading) is more common in this educational organization. We obtained informed consent from 70 (74%) of the remaining 94 students and their parents. Permission to use information from their medical dossier was obtained with 18 of the 24 non-responders. Non-response analysis revealed three significant differences. The non-responders were older (average age 18.1 versus 16.9 years; $t(82)=3.44$, $p<0.001$). The average intelligence quotient (IQ) of 11 non-responders (for whom IQ was available) was lower (89.4 versus 109.8; $t(77)= 5.14$, $p<0.0001$). Relatively more non-responders (8 [44%] versus 12 [17%] responders) had psychosocial stressors, such as ongoing conflicts between or with parents, a history of penal violation, sexual abuse, reported in their dossiers: ($\chi^2(1)= 7.58$, $p<0.01$).

Table 2 gives an overview of deafness related (degree, cause and age of onset of deafness) and other characteristics of the participants. Deafness, i.e. the permanent, bilateral, severe or profound lack of hearing speech and other sounds, was quantified as the unaided average hearing impairment for the better ear of more than 70 decibels (dB), according to the available audiological information in the medical file of the participants. Parental education was used as a measure of socio-economic status. The preferred mode of communication was classified as oral communication or signing + (i.e. use of signing and/or speech and speech reading depending on their conversation partners). Physical disorders included ophthalmic, neurological, cardiovascular, pulmonary, or other physical disorders for which specialist medical care was provided, or had been provided in the past.

Table 2.

Demographic profile of research group

Characteristic	N	%	Characteristic	N	%
Age (average 16.9 years)			*Cause of hearing loss*		
13-16 years	37	53	Hereditary	24	34
17-21 years	33	47	Rubella	8	11
Sex			Postnatal	14	20
Boy	33	47	Unknown	24	34
Girl	37	53	*Age at onset of deafness*		
*Performance IQ**			Before 19 months (prelingual)	48	68
80-100	20	30	After 19 months (postlingual)	9	13
101-140	47	70	Unknown	13	19
Ethnicity			*Communication Mode*		
Dutch	53	76	Speaking and speech reading	37	53
Other (e.g., Turkish, Surinamese)	17	24	Signing+	33	47
Family with:			*Highest educational level parents*		
Two biological parents	51	73	Low	11	16
Other	19	27	Middle-Low	16	23
Place of residence			Middle-High	15	21
Parental home	42	60	High	20	29
Residential setting	28	40	Unknown	8	11
Type of school			*Actual physical disorders**		
Special school for the deaf	52	74	None	43	63
Ordinary school	18	26	One or more	25	37
*Hearing loss**			*History of physical disorders**		
73-95 dB	13	19	0-2 different disorders	41	59
≥96 dB	54	81	3 or more different disorders	28	41

* missing data with 1-3 cases

Measures

Cognitive Testing. In accordance with best practice in testing intelligence of deaf persons (Blennerhassett, 2000), the performance scales from the Wechsler series were used in this study.

Symptom Scales. The Child Behavior Checklist (CBCL; Achenbach, 1991a; Verhulst, Van der Ende, & Koot, 1996) and the Teacher's Report Form (TRF; Achenbach, 1991b; Verhulst, Van der Ende, & Koot, 1997a) were used to assess problem behavior as reported by parents and teachers respectively. The problem items of the CBCL and the TRF generate a Total Problems scale, the "broad band" syndrome scales Internalizing and Externalizing, and eight "narrow band" syndrome scales: withdrawn, somatic complaints, and anxious/depressed (constituting the internalizing scale), delinquent behavior, and aggressive behavior (constituting the externalizing scale), and social problems, thought problems, and attention problems. The Semi-structured Clinical Interview for Children and Adolescents (SCICA; McConaughy & Achenbach, 1994; Kasius, 1997), based on the CBCL, was used to assess problem behavior as reported by clinicians and adolescents. The SCICA is scored quantitatively on the Observation form and the Self-Report form. In this study we used the SCICA Total Observations scale, the Total Self-Reports scale, the Internalizing and the Externalizing scales. In order to prevent unrealistically high scores because of the deafness of the participants, the score on the item 79 (speech problems) of the CBCL and TRF Total Problems scale was substituted by the item mean of the Dutch norm group, the scores on 5 SCICA items concerning speech and language problems (items 13, 44, 45, 88 and 108) were substituted by the mean scores of the remaining items of their scales.

Kasius (1997) reported good inter-rater agreement with the SCICA. In the present study comparable results were found for the two interviewers, a psychiatrist and a psychotherapist, both experienced with deaf adolescents and trained in using the SCICA, who attended the first 17 interviews and independently scored them. The intra-class correlation coefficients for the reliability of single ratings (Bartko & Carpenter, 1976) ranged from 0.85-0.94, indicating good agreement. The remaining 53 participants were interviewed by one of them.

Operational definitions of caseness, emotional and behavioral problems for the CBCL, TRF and SCICA. For the CBCL and TRF, an adolescent was considered a case when scoring in the borderline clinical range on the Total Problems scale. Because Kasius' (1997) sample of clinically referred adolescents is the only sample on which we have SCICA data, we used the frequency distributions from Kasius'

sample. The cut-off points for the borderline clinical range were based on results with the Youth Self-Report (YSR; Achenbach, 1991c) in the Dutch normative sample of clinically referred adolescents, as the SCICA has many items in common with the YSR and as adolescents are the source of both. Verhulst, Van der Ende, & Koot (1997b) found a YSR Total Problems score in the borderline clinical range with 41% of the clinically referred boys and 54% of the clinically referred girls. Consequently, the (100-41=)59th (boys) or (100-54=)46th (girls) percentile score in Kasius' sample of clinically referred adolescents, were used as cut-off scores for the Total Observations scale and for the Total Self-Reports scale.

For the CBCL and TRF, an adolescent was considered to have a clinically significant emotional or a behavioral problem when scoring in the clinical range of the Internalizing or the Externalizing scale respectively. The cut-off scores for the Internalizing and the Externalizing scales of the SCICA were defined as the percentile scores in Kasius' sample of clinically referred adolescents that correspond to the percentage of scores in the clinical range of the YSR Internalizing and Externalizing scales, respectively, in the Dutch norm groups of clinically referred adolescent girls and boys.

Caseness Rating and Psychiatric Classification. Two child psychiatrists (TVG, PDAT) used the scoring procedure of Goodman, Yude, Richards, and Taylor (1996) to assess psychiatric caseness on the basis of dossier data. These included demographic, deafness-related, medical and audiological variables and IQ; transcripts of written accounts of two semi-structured interviews on the psychosocial consequences of deafness with parents and their deaf adolescents (Gregory, Bishop, & Sheldon, 1995); CBCL and TRF forms without scale scores: teacher's impressions of the interactions of the adolescent with teachers and peers; transcripts of written accounts of the SCICA interview (without scale scores). Only when the caseness score indicated a definite case (original score 2A and higher), the presence of a DSM-IV classification was assessed. Following independent ratings of every ten cases, cases were discussed by the clinicians and disagreements were resolved. The DSM-IV diagnoses were grouped into (1) emotional disorders, including anxiety and mood disorders, (2) behavioral disorders, including attention-deficit and disruptive behavior disorders, and (3)

other disorders (e.g., psychosis, somatoform disorder, pain disorder). Cohen's kappa for interrater agreement was 0.83 for caseness, 0.47 for emotional disorders, and 0.36 for behavioral disorders. Shrout (1998) regards kappa values 0.11-0.40 as "slight", 0.41-0.60 as "fair", 0.61-0.80 as "moderate", and above 0.80 as "substantial" agreement. In addition Yule's Q was computed because kappa shows a downward bias when distributions deviate substantially from a 50-50% distribution. Values of 0.89 (emotional disorders) and 0.85 (behavioral disorders) were found, indicating good agreement (Spitznagel & Helzer, 1985).

Procedures

The communication mode during the interviews was determined by the interviewee. A sign-language interpreter assisted in agreement with the deaf interviewee. Both Gregory's interviews with parents and adolescents were conducted by a child psychologist. At the end of the interview parents were asked to complete the CBCL at home. Due to practical reasons – among which language difficulties (including for one of the three deaf parental couples) and the primary place of residence being the residential setting of the school - 12 parental couples did not complete the CBCL. TRF's and school reports were gathered for 68 of the participating adolescents. The intelligence of 67 participants (3 refused) was tested by a psychologist. The SCICA was administered and scored without knowledge of other sources of information about the participant.

Results

Prevalence

Table 3 shows that the CBCL- and TRF-based prevalence rates are 1.5 – 1.7 times higher than in the norm-group, that the SCICA-based prevalence rates are equal (Total Observations scale) to or even higher (Total Self-Reports scale) than in Kasius' sample of clinically referred hearing adolescents.

Table 3.

Observed and Expected Prevalence of Caseness and concordance between dossier rating and other estimates of caseness.

Scale	Caseness-criterion satisfied			χ^2 one sample test (1 df)	Concordance with dossier rating (kappa)
	Observed n (%)	Expected n (%)			
		Dutch normgroup[1]	Clinical sample[2]		
CBCL (N=58)					
- Total Problems in borderline clinical range	16 (28%)	9.3 (16%)		5.79*	.57***
TRF (N=68)					
- Total Problems in borderline clinical range	22 (32%)	11.6 (17%)		11.36***	.35**
SCICA (N=70)					
- Total Observations in borderline clinical range	34 (49%)		33.5 (48%)	0.83	.43***
- Total Self-Reports in borderline clinical range	44 (63%)		33.5 (48%)	6.31*	.38***
Dossier rating of caseness	34 (49%)				

Note: Significant differences between observed and expected frequencies are denoted with *(p<0.05), ** (p<0.01), or *** (p<0.001).

[1]: Verhulst et al. (1996, 1997).

[2]: expected percentage is weighted mean of the following percentages in Kasius (1997) sample of clinically referred adolescents: 41% boys and 54% girls

Table 4 reveals that the CBCL- and TRF-based prevalence rates of emotional problems are more than 2 times higher than in the general population of hearing adolescents. The SCICA based prevalence rate is equal to the prevalence rate in Kasius' clinical sample. For behavioral problems, the CBCL and TRF based prevalence rates are slightly (i.e. not significantly) higher than in the hearing norm groups, while the SCICA estimate is slightly (i.e. not significantly) lower than in Kasius' clinical sample (Table 4).

Table 4.

Observed and Expected prevalence of emotional and behavioral problems and concordance between dossier diagnosis of emotional and behavioral disorder and CBCL-, TRF- and SCICA estimates of clinical problems.

Diagnosis/Scale	Diagnostic criterion satisfied			χ^2 one sample test (1 df)	Concordance with dossier diagnosis (kappa)
	Observed n (%)	Expected n (%)			
		Dutch normgroup[1]	Clinical sample[2]		
Emotional problems					
CBCL Internalizing score in clinical range(n=58)	11 (19%)	5.2 (9%)		7.03**	.44***
TRF Internalizing score in clinical range (n=68)	17 (25%)	6.1 (9%)		21.26***	.17
SCICA Internalizing score in clinical range	26 (37%)		27.2 (39%)	.09	.58***
Dossier DSM-diagnosis of primary emotional disorder	19 (27%)				
Behavioral problems					
CBCL Externalizing score in clinical range (N=58)	8 (14%)	5.2 (9%)		1.63	.51***
TRF Externalizing score in clinical range (N=68)	10 (15%)	6.1 (9%)		2.70	.74***
SCICA Externalizing score in clinical range	12 (17%)		17.1 (24%)	2.01	.42***
Dossier DSM-diagnosis of primary behavioral disorder	8 (11%)				

Note: Significant differences between observed and expected frequencies are denoted with** ($p<0.01$), or *** ($p<0.001$).

[1]: Verhulst et al. (1996, 1997).

[2]: expected percentages are weighted means of the following percentages in Kasius (1997) sample of clinically referred adolescents: for SCICA internalizing scale 32% boys and 44% girls; for SCICA externalizing scale 26% (boys) and 23% (girls).

Agreement

The agreement between dossier ratings and the other measures was slight to fair, with a mean kappa of 0.43 for dossier rating of caseness and the other caseness-estimates (see Table 3), a mean kappa of 0.40 for dossier rating of emotional disorder and the estimates of emotional problems, and a mean kappa of 0.56 for dossier rating of behavioral disorder and the estimates of behavioral problems (see Table 4). The agreement between the single CBCL, TRF and SCICA estimates was generally lower, with a mean kappa of 0.30 for agreement between the single estimates of caseness, a mean kappa of 0.25 for the single estimates of emotional problems and a mean kappa of 0.33 for the single estimates of behavioral problems.

The TRF measure of emotional problems showed relatively low agreement with expert rating of emotional disorders (kappa=0.17). Therefore, we explored whether the level of agreement between the TRF measure of emotional problems and the other comparable measures (of emotional problems/disorder) might be related to characteristics of the adolescents presented in Table 2. Significant differences between kappa values ($p<0.05$) were found exclusively with communication mode. Within the sub-sample of signing+ adolescents slight levels of agreement (mean kappa=0.36) were found between TRF and all other measures. Within the sub-sample of orally communicating adolescents virtually no agreement was found (mean kappa= -0.05). This finding casts some doubts on teacher's ratings of emotional problems with orally communicating adolescents.

Associations of participant characteristics with caseness, problems and disorder.

A series of univariate logistic regressions revealed that age, deafness-variables, present physical disorders, place of residence, parental SES and immigrant status were not related to any of the assessments of caseness, emotional and behavioral problems or disorder. Gender appeared to be significantly associated with only two measures: SCICA Total Self-Reports (29 [78%] girls and 15 [46%] boys showed scores in the borderline clinical range: OR= 4.35, $p<0.01$) and Internalizing scales (22 [60%] girls and 4 [12%] boys had scores in the clinical range: OR= 10,63, $p<0.0001$). The same trend was found for the SCICA Total Observations scale, and experts ratings of caseness and emotional disorder.

Table 5.

Results of Univariate Logistic Regression Analyses to predict Dossier Rating of Caseness and DSM-IV Classification of Emotional or Behavioral Disorders from Selected Variables.

Dossier Caseness & Diagnosis	Ordinary school (n=18)[2] OR (95% CI)	Performal IQ > 100 (n=47)[2] OR (95% CI)	Oral communication (n=37)[2] OR (95% CI)	History of >2 physical disorders (n=28)[2] OR (95% CI)	2 biological parents (n=51)[2] OR (95% CI)
Dossier Caseness	0.14** (0.35-0.53)	0.12** (0.03-0.41)	0.18** (0.07-0.51)	3.66* (1.32-10.12)	0.32* (0.11-0.98)
DSM Emot. Dis.	0.45 (0.11-1.78)	0.36 (0.11-1.12)	0.41 (0.14-1.21)	7.20**(2.18-23.74)	0.53 (0.17-1.64)
DSM Behav. Dis.	---[b]	0.27 (0.06-1.35)	0.10* (0.01-0.89)	0.85 (0.19-3.95)	0.32 (0.07-1.43)

Note: OR < 1 indicates less pathology; OR > 1 indicates more pathology for specified subgroup. * p<0.05; ** p<0.005; CI= confidence interval.

[2]: n is the number of participants belonging to the specified subgroup

[b]: OR not computable: one cell with zero frequency

Table 5 shows the associations between the remaining characteristics and experts ratings of caseness and DSM disorder. Caseness was associated with all independent variables presented in Table 5. Therefore, a multivariate logistic analysis with these variables, was performed to further explore their relative importance. Now type of school and family composition were no longer significant, indicating that the differences in prevalence of caseness with adolescents from mainstream versus special schools and adolescents from families with 2 biological parents versus other families, are captured by the remaining variables, i.e. IQ, communication mode and a history of physical disorder.

The only variable significantly associated with a dossier diagnosis of a primary emotional disorder appeared to be a history of three or more physical disorders. Contrary to the finding of others (Rutter et al., 1970) separating out neurological disorder did not produce a significant association with disorder. Neither type of school nor communication mode appeared to be associated with primary emotional disorders but primary behavioral disorders were found less often in the subgroup of orally communicating adolescents than in the signing subgroup. Behavioral disorders were even absent in the subgroup of adolescents attending ordinary schools.

Discussion

This study is the first in which use has been made of both source-specific information (CBCL, TRF, SCICA) and clinically informed ratings synthesizing multi-source information to identify psychiatric caseness and disorder in a sample of deaf adolescents of normal intelligence. The expert ratings are probably the most reliable and well-founded estimates of the prevalence rates of caseness (49%), and DSM-IV disorder (27% emotional, 11% behavioral and 7% other disorders). This is because of: (1) good inter-rater reliability was found for the expert ratings; (2) the agreement between expert ratings and the judgments by single informants was overall higher than the agreement between the judgments of the single informants; (3) previous studies showed evidence for the validity of a comparable method of integrated assessment (i.e. DAWBA; Goodman et al., 2000), as well as evidence for reliability of the clinical rating system (Goodman et al, 1996); and (4)

relying on multiple sources is generally regarded as the method of choice for the identification of caseness in epidemiological settings (e.g., Fombonne, 2002).

The prevalence rates of Total Problems found with the CBCL (28%) and the TRF (32-34%) were lower than the prevalence rate of caseness found with expert ratings. Linguistic communication problems between hearing environment and deaf adolescent may have impeded the sharing of problems by the adolescent as well as recognizing and exploring these problems by parents or teachers. Our finding of virtually no agreement between the reports of the –predominantly hearing- teachers on total and emotional problems with orally communicating adolescents and all other sources of information might be an example of the effect of communicative and cultural differences between deaf adolescents and their hearing environment, as suggested by Hindley et al. (1993). In addition, coexistence of deafness and psychiatric problems may have led caregivers and teachers to the unwarranted assumption that deafness explains all, the phenomenon of diagnostic shadowing (Kitson & Thacker, 2000).

The SCICA based rates of Total Problems were equal (Total Observation 49%) to, or higher (Total Self-Reports 64%) than the rates based on expert dossier rating of caseness, contrary to our expectations. One of the mechanisms to explain the high rate of SCICA based caseness may be the willingness of the participants to discuss their problems more openly both as participants in a study and in a safe interview situation where communication was tuned to their needs. In addition, it should be noted that higher rates were not found with boys. The observed significant preponderance of girls with SCICA based self-reported total problems as well as internalizing problems may reflect the interference of heightened affiliative needs with specific biological and social transition difficulties for adolescent girls as compared to boys (Cyranowski, Frank, Young & Shear, 2006). As compared to hearing peers, deaf girls might be even more vulnerable to the social challenges due to communication problems within a hearing world.

Another distinct contribution of this study is our findings on the relationship between clinical ratings of caseness and disorder on the one hand and a large number of demographic, deafness-related, medical and audiological variables on the other. Multiple logistic regression revealed three factors to be significantly

associated with psychopathology: Lower IQ, a signing mode of communication and three or more physical disorders in the past were associated with dossier rating of caseness. A history of physical disorders was the only variable associated with emotional disorder. This is in line with the replicated finding that factors interfering with physical health are risk factors of emotional dysregulation and psychopathology in hearing children (see Friedman & Chase-Lansdale, 2002). Likewise, low IQ is a known risk factor with both hearing (e.g., Friedman et al, 2002) and deaf children (e.g., Van Eldik et al., 2004; van Eldik, 2005). The association between communication mode and psychopathology is less clear. Only behavioral disorders were found more often among signing adolescents as well as adolescents in special school, while emotional disorders were more equally distributed among these subgroups. It could be hypothesized that pupils with more externalizing, disturbing behavior are more likely to be referred to special schools, where signing is the dominant communication mode between deaf pupils. Simultaneously, deaf pupils with non-disturbing behavior and conforming coping strategies might adapt more successfully in mainstreaming, as has been suggested by Lynas (1985). Summarizing, the correlational findings in this study support the view that it is not deafness per se that contributes to psychiatric problems (Hindley & Van Gent, 2002), but that additional factors, such as communication problems, physical health problems, adverse living conditions and other factors may increase the risk of psychiatric disorders in this population.

Limitations

The limitations of this study include small sample size, 26% refusal rate and a relatively high rate of oral communication. However, in view of the characteristics of the non-responders (e.g., lower IQ) and the lower prevalence of caseness among orally communicating adolescents, it seems unlikely that the prevalence of psychopathology is overestimated. Another limitation concerns the restriction to deaf adolescents of average intelligence. Finally, it must be noted that in twelve cases both the SCICA and the dossier rating were scored by the same psychiatrist (TvG). The effect of this is likely to be limited due to the considerable lapse of time between the SCICA scoring and dossier rating, and the fact that the dossier rating was based on consensus between two psychiatrists.

Implications

Our results indicate a high prevalence of psychopathology, especially emotional disorders. In addition, we found that only 3 of 32 adolescents with DSM disorders had had contact with a specialist mental health service before the time of study.

These findings illustrate the need to identify children and adolescents at risk for psychopathology more effectively and preferably in an early stage. One of the targets for the future development of mental health care for deaf children and young people should be the organization of cooperation between institutions for deaf children, existing local specialist mental health services and specialist mental health services for deaf and hard of hearing children and adolescents to promote early and adequate help seeking and referral.

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