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ORIGINAL ARTICLE

Prevalence of psychosocial problems in Dutch children aged 8–12 years and its association with risk factors and quality of life

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Aims. To determine the prevalence of psychosocial problems among Dutch children aged 8–12 years and studying its association with risk factors and quality of life.

Methods. This study was conducted within the framework of a community-based health study in the north-west region of the Netherlands. The cross-sectional study sample consisted of 2703 children (1392 boys and 1311 girls). Psychosocial problems and quality of life were measured with the extended version of the Strengths and Difficulties Questionnaire (SDQ) and KIDSCREEN-10, respectively. Questionnaires and data about risk factors (parental education level, ethnicity, family structure, income, chronic diseases and life events) were completed by the parents or caregivers.

Results. The prevalence of psychosocial problems (SDQ score ≥14) in the total sample was 10.4%. The prevalence was higher in boys compared with girls (13.9% *v.* 6.6%, OR = 2.28; 95% CI = 1.75–2.97). Boys had significantly more hyperactivity/inattention, conduct, peer relationship and prosocial behaviour problems compared with girls. Risk factors associated with psychosocial problems were: one or more chronic disease(s), life event(s), a low parental educational level (for boys only) and an income under a modal level. Psychosocial problems were significantly inverse related with quality of life in the total sample (rho = −0.47).

Conclusions. Psychosocial problems are common in children, especially among boys, and are inversely related with children's quality of life. The identified risk factors in this study can be useful for developing targeted prevention strategies aimed at children at high risk for psychosocial problems.

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Key words: psychosocial problems, prevalence, children, SDQ, KIDSCREEN.

Introduction

Psychosocial problems in children

Psychosocial problems among children cause serious limitations in daily functioning (Brugman *et al.* 2001) and have large social and economic consequences for family and society (World Health Organization, 2001). The term 'psychosocial problems' is used for an extensive group of phenomena and are frequently divided into two areas: externalizing problems (behavioural problems) and internalizing problems (emotional problems). In particular, behavioural problems such as oppositional-defiant disorder, conduct disorder and attention-deficit and hyperactivity disorder (ADHD) and emotional problems such as anxiety disorders and depression are frequently diagnosed among youths (Verhulst *et al.* 1997*b*). Both externalizing and internalizing problems are related to various negative outcomes on adult age. For example, conduct problems during childhood are associated with crime and drugs use (Fergusson *et al.* 2005). In addition, internalizing problems in adolescents are related to increased anxiety and depression in early adulthood (Pine *et al.* 1998; Weissman *et al.* 1999). In general, children with high levels of parent-reported emotional and behavioural problems are more likely to meet the criteria of the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) psychiatric diagnoses in adulthood than children without these problems (Hofstra *et al.* 2002).

Prevalence rates of psychosocial problems vary with age, methods used to assess these problems and the

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sample. The prevalence of psychosocial problems in children and pre-adolescents has been estimated in several European countries (i.e. Great Britain, Germany, Italy and The Netherlands) and appears to be approximately 10–15% (Goodman *et al.* 2000; Meltzer *et al.* 2000; Crone *et al.* 2008; Ravens-Sieberer *et al.* 2008; Frigerio *et al.* 2009).

Sex differences

Boys more often have psychosocial problems than girls (Zeijl *et al.* 2005) and are three to four times more diagnosed as having conduct disorders than girls (Loeber *et al.* 2000). The difference in prevalence of psychosocial problems is partly attributable to the fact that boys have more externalizing disorders, which are more visible to others (Costello *et al.* 2003). During adolescence, the prevalence of mood disorders increases in girls whereas it remains stable in boys. These differences persist during adulthood (Hankin *et al.* 1998).

Risk factors

Several factors have been associated with a higher risk for the development of psychosocial problems. Psychosocial problems are more often found in children with parents with a low socio-economic status, in children whose mother was younger than 27 years old at time of birth of the child, and in children living in a single parent family (Kroes *et al.* 2002; Zeijl *et al.* 2005; Amone-P'Olak *et al.* 2009). Children living with single mothers are twice as likely to have definite or severe difficulties with psychosocial problems that interfere in their everyday life than children living with two parents (Simpson *et al.* 2005). Furthermore, children who experience stressful life events in their early years, for example migration and loss of a family member, are more at risk for developing externalizing problems in the later childhood (Mesman & Koot, 2001; Kroes *et al.* 2002). Also, in children with chronic physical illness, the risk of psychosocial problems is doubled compared to healthy children (Bilfield *et al.* 2006). Finally, family conflicts, parental strain and growing up with a step-parent are related to mental health problems in adolescents (Wille *et al.* 2008).

Prevention

Screening and treatment of psychosocial problems may improve the prognosis of children with psychosocial problems, especially when the screening occurs with good validated instruments (Durlak & Wells, 1998). Still, a minority of the children with psychosocial problems is in contact with the mental health care (Verhulst & van der Ende, 1997*a*; Brugman *et al.* 2001). The prevention of depression is one of the specific areas of attention in the Dutch collective prevention. It is known that having psychosocial problems in childhood is a risk factor for negative outcomes (i.e., crime, drug use and psychiatric diagnosis) at adult age (Reinherz *et al.* 1999; Fergusson *et al.* 2005). Therefore, it is important to know the prevalence of psychosocial problems among children. So far, empirical data about psychosocial problems in Dutch children aged 8–12 years and the relationship with risk factors and quality of life are sparse. Information about prevalence of psychosocial problems can be used by the Municipal Health Service and municipalities to set priorities for their policy in order to prevent or reduce the prevalence of psychosocial problems among young children.

Aim of the study

Therefore, the aim of this current study was (a) to determine the prevalence of psychosocial problems among Dutch children aged 8–12 years and (b) to study its association with risk factors and quality of life. A large population-based sample of 2703 children (1392 boys and 1311 girls) was used. The parents or caregivers completed the relatively new, validated and reliable Strengths and Difficulties Questionnaire (SDQ) and the KIDSCREEN, measuring psychosocial problems and quality of life, respectively. Data about several important mediating risk factors were collected. All data were analysed separately for boys and girls because of hypothesized sex differences.

Methods

Recruitment and sample selection

This study was conducted within the framework of a community-based health study carried out in two regions in the north west of The Netherlands in 2007. The presented data were part of a larger study in children aged 0–12 years conducted by the Municipal Health Service and induced by the law on public health. The overall aim of the total study was to describe the health situation of the children.

In the regions Kop van Noord-Holland and West-Friesland, a random sample of children aged 0–12 years was drawn per municipality from the Municipal Population Registration. Before starting with the sample selection, the population of one of the two regions was additionally stratified for age groups (0–4, 4–8 and 8–12 years).

The questionnaires about psychosocial problems, quality of life and several risk factors were completed

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by the parents and/or caregivers (proxies), because most children in this sample were too young to formulate a response. Parents are commonly used as proxies who provide information about the behaviour of children (Najman *et al.* 2001). In this study a population-based study sample of children aged 8–12 years were included.

Procedure

A postal questionnaire was sent to the parents/caregivers of the randomly selected children. On the first page of the questionnaire a letter was printed in which the study was introduced and explained. The questionnaires had to be returned by mail. In order to raise the response, a reminder was sent to the parents after 3 weeks. The parents/caregivers in West-Friesland also received a second reminder: a new questionnaire was sent 3 weeks after the first reminder. The data were collected from February to April 2007.

Response

In the Kop van Noord-Holland, the questionnaire was sent to the parents of 2360 children aged 8–12 years. A total of 1497 questionnaires (response: 63%) were appropriate for analyses. For West-Friesland, the questionnaire was sent to the parents of 1654 children aged 8–12 years. A total of 1206 questionnaires were suitable for analysis (response: 73%). The overall response rate was 67%.

Measures

Psychosocial problems

Psychosocial problems in children were measured with the extended version of the SDQ, completed by their parents/caregivers. The SDQ is a relatively short questionnaire where strengths as well as difficulties of a child in the previous month are being asked (Goodman *et al.* 2000). It consists of 25 items that can be grouped in the following five 5-item subscales: hyperactivity/inattention, emotional symptoms, conduct problems, peer relationship problems and prosocial behaviour. Each item has three answer possibilities, to which can be assigned a value (0 = 'not true', 1 = 'somewhat true', 2 = 'certainly true'). For each subscale, the scores can be summed, by which a sub score for each scale is calculated. This score varies from 0 to 10. High scores on the prosocial behaviour subscale indicate strengths, whereas high scores on other subscales indicate difficulties. A total problem score can be calculated by adding the scores of the subscales, with the exception of the prosocial behaviour scale. The total SDQ score varies between 0 and 40. A total SDQ score of ≥14 indicates psychosocial problems (Goedhart *et al.* 2003). The cut-offs for problems on the subscales are as follows: emotional problems ≥5, conduct problems ≥4, hyperactivity problems ≥7 and peer relationship problems ≥4. We defined prosocial behaviour problems as scores of <5 on the prosocial behaviour subscale.

An extended version of the SDQ includes an impact supplement of eight questions, asking if the respondent thinks the child has a problem, and explores the chronicity, distress, social impairment and burden for others. This provides useful additional information about the degree of impact of problems on the child's daily life. From these questions, an impact score can be calculated (range 0–10). An impact score of ≥2 indicates raised impact of the problems on the child's daily life. Because of its brevity, the SDQ is suitable and commonly used in epidemiological studies. The SDQ is a validated, reliable and responsive measure with good psychometric properties (Goodman, 2001; Muris *et al.* 2003; van Widenfelt *et al.* 2003). Concurrent validity with several psychopathology measures (e.g. Child Behaviour Checklist (CBCL), Youth Health Questionnaire) was good (Muris *et al.* 2003; van Widenfelt *et al.* 2003) and high SDQ scores were associated with DSM-IV diagnosis of several psychiatric disorders in children (Goodman, 2001).

Risk factors

Information about risk factors, i.e. education level of the parents, ethnicity, family structure, level of income of the household, chronic diseases and life events was obtained by the questionnaire. Parental education level was included as indicator of the social economic status and concerned the highest degree obtained by a parent. It was divided into three categories: low (lower secondary education or below), medium (upper secondary education) and high (tertiary education). Ethnicity was categorized as Dutch nationality, non-Dutch western nationality and non-western nationality, based upon the country of birth of the child and of the parents. The family structure is categorized into whether the child lives in a single parent family or not (all other family structures). Income of the household was divided into below or equal to a modal level (net income ≤1750 euro/month), and above the modal level, according to the classification of income by Statistics Netherlands (CBS) in 2006. A list of 15 chronic diseases commonly seen in children and a list of 22 life events were included in the questionnaire. Parents could mark the diseases that the

child had and life events that the family had experienced. Chronic diseases and life events were summed and categorized into ≥1 *v.* none chronic diseases and life events.

Quality of life

Quality of life is determined with the KIDSCREEN-10 proxy version for parents or primary caregivers (Ravens-Sieberer *et al.* 2001). Quality of life can be described as a multidimensional construct covering physical, emotional, mental, social and behavioural components of well-being and function as perceived by patients or other individuals (Ravens-Sieberer *et al.* 2001). The KIDSCREEN is a quality of life measurement that is applicable to healthy and chronically ill children and adolescents aged 8–18 years. The KIDSCREEN-10 is the short version of the KIDSCREEN instrument (The KIDSCREEN Group Europe, 2006) and consists of ten questions about quality of life in the previous week. The reliability and validity was tested in 13 participating European countries. For the KIDSCREEN-10 proxy version, a satisfactory item internal consistency has been shown. The overall reliability was good (Cronbach's alpha: 0.78) and the agreement between youth and proxy report was good (intra class correlation coefficient: 0.56). The correlation between the self-report and the proxy version of the KIDSCREEN-10 index was 0.57. The Dutch population norms were available for the parent version, for the total group of children as well as for males and females separately. For each item of the KIDSCREEN-10, a score of 1–5 can be obtained, resulting in a total quality of life score with a range of 10–50. Higher scores indicate a better quality of life.

Data analysis

All analyses were performed separately for boys and girls because of the statistically significant effect modification by sex of the relations under condition. Descriptive data (means, standard deviation and percentage) were presented for the total study sample and for boys and girls separately. Differences in study sample characteristics by sex were examined using Student *t* test for continuous variables and χ^2-tests for categorical variables. As no differences in study sample characteristics were found between the two regions in the prevalence of psychosocial problems (SDQ score ≥14) and on any of the five SDQ subscales, the data of the two regions were merged and analysed together. χ^2-tests were used to study the differences in psychosocial problems and the five SDQ subscales scores by sex, using the predefined cut-off scores for the SDQ and its subscales. Next, univariable and multivariable stepwise logistic regression analysis were performed to determine the influence of the risk factors on psychosocial problems. To investigate multicollinearity, the variance-inflation factor (VIF) was determined in a regression model including all risk factors. All VIF values were between 1.00 and 1.81, indicating no multicollinearity. In sensitivity analysis, we assessed the correlation between the risk factors and each SDQ subscale, except for prosocial behaviour problems because its prevalence was too low to reliably assess its association with the risk factors. Because of the skewed distribution of the total SDQ score and KIDSCREEN score, we used the non-parametric Spearman's rho to assess the association between psychosocial problems (both SDQ total and SDQ subscale scores) and quality of life (the total KIDSCREEN-10 score). For all statistical testing, we used two-sided hypothesis testing with an alpha level of 0.05. Statistical analyses were performed using the SPSS 15 software package for Windows.

Results

Study sample

The characteristics of the study sample are presented in Table 1. A total of 2703 children were included in the analysis (51.5% (n = 1392) boys and 48.5% (n = 1311) girls). Boys had significantly more often a chronic disease, experienced a life event and had a non-Dutch nationality. No difference between boys and girls was found for parental education level, family structure and income level.

Prevalence of psychosocial problems

The prevalence of psychosocial problems (SDQ score ≥14) in the total sample was 10.4%. Boys had more psychosocial problems than girls (13.9% *v.* 6.6%, OR = 2.28; 95% CI = 1.75–2.97; Fig. 1). Boys have significantly more hyperactivity/inattention, conduct, peer relationship and prosocial behaviour problems compared with girls, but not regarding emotional problems. Hyperactivity and attention deficit problems were the most common problems (14.8%) in boys. Emotional problems (7.5%) were the problems most frequently found in girls. In 9.6% of all children, the impact score was ≥2, indicating that their problems interfere definitely or severely with the child's everyday life in home life, friendships, classroom learning or leisure activities. The raised impact of psychosocial problems in children's daily life was more often found in boys than in girls (11.6% *v.* 7.6%, OR = 1.59; 95% CI = 1.22–2.08; data not shown).

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Table 1. *Characteristics of the study sample by sex*

	Total group ($n = 2703$)		Boys ($n = 1392$)		Girls ($n = 1311$)	
Region						
Kop van Noord-Holland	1497/2703	55.4%	787/1392	56.5%	710/1311	54.2%
West-Friesland	1206/2703	44.6%	605/1392	43.5%	601/1311	45.8%
Mean age (years)	10.0	±1.2*	10.0	±1.2*	10.0	±1.2*
Aged 8–9 years	1320/2703	48.8%	678/1392	48.7%	642/1311	49.0%
Aged 10–12 years	1383/2703	51.2%	714/1392	51.3%	669/1311	51.0%
Parental educational level						
Low	627/2660	23.6%	332/1375	24.1%	295/1285	23.0%
Medium	1216/2660	45.7%	624/1375	45.4%	592/1285	46.1%
High	817/2660	30.7%	419/1375	30.5%	398/1285	31.0%
Ethnicity						
Dutch nationality	2472/2702	91.5%	***1255/1392***	***90.2%***	***1217/1310***	***92.9%***
Non-Dutch, Western nationality	104/2702	3.8%	***64/1392***	***4.6%***	***40/1310***	***3.1%***
Non-Dutch, non-Western nationality	126/2702	4.7%	73/1392	5.2%	53/1310	4.0%
Family structure						
Single parent family	417/2692	15.5%	207/1386	14.9%	210/1306	16.1%
Non-single parent family	2275/2692	84.5%	1179/1386	85.1%	1096/1306	83.9%
Income level						
Below modal	489/2134	22.9%	258/1101	23.4%	231/1033	22.4%
Above modal	1645/2134	77.1%	843/1101	76.6%	802/1033	77.6%
≥1 Chronic disease(s) diagnosed	581/2603	22.3%	***331/1332***	***24.8%***	***250/1271***	***19.7%***
≥1 Life event(s)	2020/2684	75.3%	***1062/1380***	***77.0%***	***958/1304***	***73.5%***

*Standard deviation.
Significant differences ($p < 0.05$) between sex are printed bold and cursive.

Risk factors

The odds ratio (OR) and the 95% CI of the univariable logistic regression are presented in Table 2. Univariable analyses revealed that having one or more chronic diseases or having experienced one or more life event was associated with psychosocial problems. Low parental educational level was associated with psychosocial problems compared to high educational level, but not to medium educational level. Living in a single parent family and having a below modal or similar to modal household income were also associated with psychosocial problems. Region, ethnicity and age were not related to psychosocial problems.

When the stepwise multivariable logistic regression was performed (Table 3), only four of the eight variables contributed significantly to the model. One or more chronic diseases, having experienced life event (s) and an income below the modal level are associated with psychosocial problems. Parental educational level was associated with psychosocial problems in boys but not in girls.

In sensitivity analysis, we observed that chronic diseases and life events were significantly related to elevated scores on each SDQ subscale in the total sample (range OR: 1.70–2.69 and OR: 1.76–3.68, respectively). In addition, low income was related to the presence of emotional problems and peer problems. Furthermore, single parent family was associated

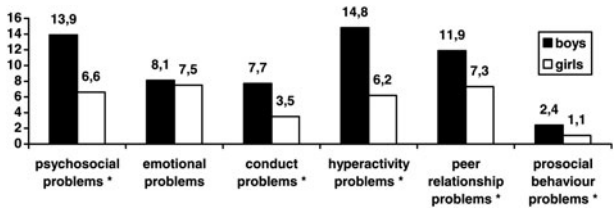

Fig. 1. Prevalence rates (%) for psychosocial problems (SDQ-score ≥14) and the five SDQ subscales scores by sex ($N = 2703$). *Significant ($p < 0.05$) difference in prevalence rates for psychosocial problems between boys and girls.

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Table 2. *Univariable OR for high levels of psychosocial problems (SDQ-score≥14) by sex with risk factors*

	Univariable OR total	95% CI	Univariable OR boys	95% CI	Univariable OR girls	95% CI
West-Friesland	0.96	0.75–1.24	0.92	0.68–1.25	1.11	0.72–1.72
Aged 10–12 years	0.97	0.76–1.25	1.06	0.78–1.44	0.81	0.52–1.25
Parental educational level						
Medium	0.80	0.60–1.08	0.71	0.49–1.02	1.04	0.62–1.75
High	***0.55***	0.39–0.77	***0.59***	0.39–0.88	***0.46***	0.24–0.90
Ethnicity						
Non-Dutch, western	1.40	0.79–2.50	1.33	0.68–2.61	1.18	0.36–3.93
Non-Dutch, non-western	1.60	0.97–2.65	1.53	0.83–2.79	1.52	0.59–3.93
Single parent family	***1.59***	1.17–2.16	***2.02***	1.40–2.93	1.02	0.56–1.84
Below modal income	***1.99***	1.49–2.67	***2.11***	1.47–3.01	***1.78***	1.05–2.99
≥1 Chronic disease(s) diagnosed	***3.06***	2.35–3.98	***2.69***	1.94–3.72	***3.52***	2.24–5.54
≥1 Life event(s)	***3.18***	2.13–4.75	***3.42***	2.04–5.73	***2.62***	1.38–5.00

The reference categories are: Kop van Noord-Holland, aged 8–9 years, low educational level, Dutch nationality, non-single parent family, above modal income, no chronic diseases diagnosed, no life events experienced.
Significant relationships ($p < 0.05$) are printed bold and cursive.

with conduct problems and hyperactivity problems. A younger age was related to conduct problems, and low education level was related to hyperactivity problems (data not shown).

Quality of life

Psychosocial problems are significantly inversely related to children's quality of life in the total sample (Spearman's rho = −0.47, $p < 0.001$). Because virtually similar associations were found for boys and girls, we only report associations for the total group. From the correlations between the five subscales of the SDQ and children's quality of life, emotional problems showed the largest negative correlation with quality of life (rho = −0.42), followed by peer relationship problems (rho = −0.33, $p < 0.001$), hyperactivity problems (rho = −0.30, $p < 0.001$) and conduct problems (rho = −0.28, $p < 0.001$). As expected, a positive correlation was found for the subscale pro-social behaviour (rho 0.21, $p < 0.001$). Then 40.6% of the children with psychosocial problems had a low quality of life compared with 4.0% of the children with no psychosocial problems ($p < 0.001$) (data not shown). A high quality of life was found in 9.8% of the children with psychosocial problems, while 53.1% of the children without psychosocial problems had a high quality of life (data not shown).

Discussion

In this Dutch population-based study, we observed that psychosocial problems are prevalent in children

Table 3. *Multivariable OR for high levels of psychosocial problems (SDQ-score≥14) by sex with risk factors*

	Multivariable OR total	95% CI	Multivariable OR boys	95% CI	Multivariable OR girls	95% CI
Parental educational level						
Medium	–	–	0.71	0.47–1.06	–	–
High	–	–	***0.47***	0.26–0.83	–	–
Below modal income	***1.81***	1.32–2.48	***1.60***	1.07–2.41	***1.73***	1.01–2.98
≥1 Chronic disease(s) diagnosed	***3.08***	2.29–4.15	***2.93***	2.01–4.26	***3.16***	1.89–5.28
≥1 Life event(s)	***3.52***	2.11–5.88	***4.32***	2.14–8.72	***2.41***	1.13–5.16

The reference categories are: low educational level, above modal income, no chronic diseases diagnosed, no life events experienced. Significant relationships ($p < 0.05$) are printed bold and cursive.

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aged 8–12 years and are related to a reduced quality of life. In this present study, we found that 10.4% of children aged 8–12 years had psychosocial problems. Our prevalence of psychosocial problems in children is in line with other studies that used the SDQ (Goodman *et al.* 2000; Crone *et al.* 2008) or other methods to assess psychosocial problems (Meltzer *et al.* 2000; Ravens-Sieberer *et al.* 2008; Frigerio *et al.* 2009).

Zeijl *et al.* (2005) found that 6% of the Dutch children aged 8–12 have psychosocial problems. This proportion is lower than the prevalence found in our study. However, this prevalence was based on CBCL that was completed by the parents, which uses American reference scores for psychosocial problems (Zeijl *et al.* 2005). The use of a different outcome measure is most likely explaining the higher prevalence of psychosocial problems in our sample.

Furthermore, we found that psychosocial problems, in particular externalizing symptoms such as hyperactivity and conduct problems, are more common in boys than in girls. This is consistent with other studies (Brugman *et al.* 2001; Zeijl *et al.* 2005) but is in contrast with Crone *et al.* (2008), where no significant difference between boys and girls was found. However, the study sample of Crone *et al.* (2008) was considerably smaller ($n = 707$) than our study and therefore possibly no difference could be detected. Achenbach *et al.* (1987) stated that parents are well able to assess the externalizing problems of a child but that they are less accurate in the appraisal of internalizing problems of the child. Because boys more often have externalizing problems that are more visible to others and girls more often have internalizing problems that are more difficult to observe (Costello *et al.* 2003), it is possible that the psychosocial problems in girls are generally underestimated. This might also explain the similar levels of emotional problems for boys and girls reported by the parent.

This study confirmed that having a chronic disease is a risk factor for psychosocial problems, as found elsewhere (Bilfield *et al.* 2006). Furthermore, life events were related to psychosocial problems. Harland *et al.* (2002) measured the association of several life events with psychosocial problems. They found that parental divorce and having an ill or hospitalized family member were significantly related to psychosocial problems in children.

In our study, age was not related to psychosocial problems. This could be due to the small age range. The prevalence of psychosocial problems in this study was not related to ethnicity. This is in accordance with another study conducted in the Netherlands (Zwirs *et al.* 2007) but in contradiction with the results of Harland *et al.* (2002).

Psychosocial problems are related to a lower quality of life. The correlations between psychosocial problems and quality of life (Spearman's rho = −0.47) can be seen as a moderately negative association. In a European validation study of the KIDSCREEN instrument, an effect size of 0.67 was found, indicating a moderate to large association between the SDQ and the KIDSCREEN-10 (The KIDSCREEN Group Europe, 2006). This association is higher than the association we found. However, the European study was not limited to children aged 8–12 years and was conducted in a different study population.

Several strengths of our study need to be emphasized. First, we used data from a large population-based sample. Second, we used validated and reliable instruments for measuring both psychosocial problems and quality of life. Finally, the outcomes are presented separately for boys and girls because of the effect modification by sex.

Our study also has several limitations. First, the present study has a cross-sectional design, thus we cannot infer conclusions regarding causality. Second, the response was about 67% in the two regions. In this analysis, a non-response analysis could not be performed. In Muris *et al.* (2003) and Van Widenfelt *et al.* (2003), it was found that children whose parents did not respond, had higher self-rated psychosocial problems. It is possible that the response here may underestimate the real prevalence of problems. Third, another concern is the high item non-response for the question about level of income. Yet, additional analyses showed that the prevalence of psychosocial problems did not differ between responders and non-responders on this question. The same risk factors for psychosocial problems were found when the level of income was excluded from the model, with the addition of living in a single parent family. However, it is likely that single parent families generally have lower incomes than two parent families and therefore a significant contribution of family structure is found in the model without the level of income. Fourth, the prevalence is based on single informants, i.e. parents or caregivers. Measurements of psychosocial health based on several informants (e.g. parents, children and teachers) are found to be more accurate (Goodman *et al.* 2000). However, SDQs completed by parents are better predictors of psychiatric disorders than SDQs completed by adolescents themselves (Goodman *et al.* 2000). When the children's self-report of the KIDSCREEN is available, this should be used instead of the proxy report. The proxy report can be regarded as complementary information (The KIDSCREEN Group Europe, 2006). Finally, the present study was limited to a population living in a rural area in the northwest of The Netherlands. This population largely consisted of Dutch Caucasians. A previous study in the Netherlands showed that the prevalence

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of psychosocial problems is higher in immigrant children (Reijneveld *et al.* 2005). It is unclear whether the relationship between psychosocial problems, risk factors and quality of life is similar in other racial and ethnic groups from more urban areas.

Conclusion

Our results give important insight into the prevalence of psychosocial problems and its relationship with risk factors and quality of life for both Dutch boys and girls separately. The identified risk factors in this study can be used for developing targeted prevention strategies aimed at children at high risk for psychosocial problems. Moreover, further well-designed prospective research is needed, to study the differences in psychosocial problems across sex and racial/ethnic groups over time ideally using parents, children and teachers reports.

Declaration of Interest

None declared. Financial support was provided by the Ministry of Health, Welfare and Sport of the Netherlands.

References

Achenbach TM, McConaughy SH, Howell CT (1987). Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. *Psychological Bulletin* **101**, 213–232.

Amone-P'Olak K, Burger H, Ormel J, Huisman M, Verhulst FC, Oldehinkel AJ (2009). Socioeconomic position and mental health problems in pre- and early-adolescents: the TRAILS study. *Social Psychiatry and Psychiatric Epidemiology* **44**, 231–238.

Bilfield S, Wildman BG, Karazsia BT (2006). Brief report: the relationship between chronic illness and identification and management of psychosocial problems in pediatric primary care. *Journal of Pediatric Psychology* **31**, 813–817.

Brugman E, Reijneveld SA, Verhulst FC, Verloove-Vanhorick SP (2001). Identification and management of psychosocial problems by preventive child health care. *Archives of Pediatrics and Adolescent Medicine* **155**, 462–469.

Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry* **60**, 837–844.

Crone MR, Vogels AG, Hoekstra F, Treffers PD, Reijneveld SA (2008). A comparison of four scoring methods based on the parent-rated Strengths and Difficulties Questionnaire as used in the Dutch preventive child health care system. *BMC Public Health* **8**, 106.

Durlak JA, Wells AM (1998). Evaluation of indicated preventive intervention (secondary prevention) mental health programs for children and adolescents. *American Journal of Community Psychology* **26**, 775–802.

Fergusson DM, Horwood LJ, Ridder EM (2005). Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry* **46**, 837–849.

Frigerio A, Rucci P, Goodman R, Ammaniti M, Carlet O, Cavolina P, De Girolamo G, Lenti C, Lucarelli L, Mani E, Martinuzzi A, Micali N, Milone A, Morosini P, Muratori F, Nardocci F, Pastore V, Polidori G, Tullini A, Vanzin L, Villa L, Walder M, Zuddas A, Molteni M (2009). Prevalence and correlates of mental disorders among adolescents in Italy: the PrISMA study. *European Child and Adolescent Psychiatry* **18**, 217–226.

Goedhart AW, Treffers PDA, Van Widenfelt BM (2003). Vragen naar psychische problemen bij kinderen en adolescenten. *Maandblad Geestelijke Volksgezondheid* **58**, 1018–1035.

Goodman R (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry* **40**, 1337–1345.

Goodman R, Ford T, Simmons H, Gatward R, Meltzer H (2000). Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *British Journal of Psychiatry* **177**, 534–539.

Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE (1998). Development of depression from preadolescence to young adulthood: emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology* **107**, 128–140.

Harland P, Reijneveld SA, Brugman E, Verloove-Vanhorick SP, Verhulst FC (2002). Family factors and life events as risk factors for behavioural and emotional problems in children. *European Child and Adolescent Psychiatry* **11**, 176–184.

Hofstra MB, van der Ende J, Verhulst FC (2002). Child and adolescent problems predict DSM-IV disorders in adulthood: a 14-year follow-up of a Dutch epidemiological sample. *Journal of the American Academy of Child and Adolescent Psychiatry* **41**, 182–189.

Kroes M, Kalff AC, Steyaert J, Kessels AG, Feron FJ, Hendriksen JG, van Zeben TM, Troost J, Jolles J, Vles JS (2002). A longitudinal community study: do psychosocial risk factors and child behavior checklist scores at 5 years of age predict psychiatric diagnoses at a later age? *Journal of the American Academy of Child and Adolescent Psychiatry* **41**, 955–963.

Loeber R, Burke JD, Lahey BB, Winters A, Zera M (2000). Oppositional defiant and conduct disorder: a review of the past 10 years, part I. *Journal of the American Academy of Child and Adolescent Psychiatry* **39**, 1468–1484.

Meltzer H, Gatward R, Goodman R, Ford T (2000). Mental Health of Children and Adolescents in Great Britain. London: Office for National Statistics. Stationery Office.

Mesman J, Koot HM (2001). Early preschool predictors of preadolescent internalizing and externalizing DSM-IV diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry* **40**, 1029–1036.

Muris P, Meesters C, van den Berg F (2003). The Strengths and Difficulties Questionnaire (SDQ) – further evidence for

its reliability and validity in a community sample of Dutch children and adolescents. *European Child and Adolescent Psychiatry* **12**, 1–8.

Najman JM, Williams GM, Nikles J, Spence S, Bor W, O'Callaghan M, Le Brocque R, Andersen MJ, Shuttlewood GJ (2001). Bias influencing maternal reports of child behaviour and emotional state. *Social Psychiatry and Psychiatric Epidemiology* **36**, 186–194.

Pine DS, Cohen P, Gurley D, Brook J, Ma Y (1998). The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. *Archives of General Psychiatry* **55**, 56–64.

Ravens-Sieberer U, Gosch A, Abel T, Auquier P, Bellach BM, Bruil J, Dur W, Power M, Rajmil L (2001). Quality of life in children and adolescents: a European public health perspective. *Sozial and Praventivmedicin* **46**, 294–302.

Ravens-Sieberer U, Wille N, Erhart M, Bettge S, Wittchen HU, Rothenberger A, Herpertz-Dahlmann B, Resch F, Holling H, Bullinger M, Barkmann C, Schulte-Markwort M, Dopfner M (2008). Prevalence of mental health problems among children and adolescents in Germany: results of the BELLA study within the National Health Interview and Examination Survey. *European Child and Adolescent Psychiatry* **17** (Suppl. 1), 22–33.

Reijneveld SA, Harland P, Brugman E, Verhulst FC, Verloove-Vanhorick SP (2005). Psychosocial problems among immigrant and non-immigrant children–ethnicity plays a role in their occurrence and identification. *European Child and Adolescent Psychiatry* **14**, 145–152.

Reinherz HZ, Giaconia RM, Hauf AM, Wasserman MS, Silverman AB (1999). Major depression in the transition to adulthood: risks and impairments. *Journal of Abnormal Psychology* **108**, 500–510.

Simpson GA, Bloom B, Cohen RA, Blumberg S, Bourdon KH (2005). U.S. children with emotional and behavioral difficulties: data from the 2001, 2002, and 2003 National Health Interview Surveys. *Advance Data* **360**, 1–13.

The KIDSCREEN Group Europe (2006). The KIDSCREEN Questionnaires – Quality of Life Questionnaires for Children and Adolescents. Handbook. Pabst Science Publishers: Lengerich.

van Widenfelt BM, Goedhart AW, Treffers PD, Goodman R (2003). Dutch version of the Strengths and Difficulties Questionnaire (SDQ). *European Child and Adolescent Psychiatry* **12**, 281–289.

Verhulst FC, van der Ende J (1997a). Factors associated with child mental health service use in the community. *Journal of the American Academy of Child and Adolescent Psychiatry* **36**, 901–909.

Verhulst FC, van der Ende J, Ferdinand RF, Kasius MC (1997b). The prevalence of DSM-III-R diagnoses in a national sample of Dutch adolescents. *Archives of General Psychiatry* **54**, 329–336.

Weissman MM, Wolk S, Goldstein RB, Moreau D, Adams P, Greenwald S, Klier CM, Ryan ND, Dahl RE, Wickramaratne P (1999). Depressed adolescents grown up. *Journal of the American Medical Association* **281**, 1707–1713.

Wille N, Bettge S, Ravens-Sieberer U (2008). Risk and protective factors for children's and adolescents' mental health: results of the BELLA study. *European Child and Adolescent Psychiatry* **17** (Suppl. 1), 133–147.

World Health Organization (2001). Burden of Mental and Behavioral Disorders. In World Health Report 2001. Mental Health: New Understanding, New Hope. World Health Achieves: Geneva, pp. 21–45.

Zeijl E, Crone MR, Wiefferink K, Keuzenkamp S, Reijneveld M (2005). Kinderen in Nederland [Children in the Netherlands]. Social and Cultural Planning of the Netherlands/ Netherlands Organisation for Applied Scientific Research: The Hague.

Zwirs BW, Burger H, Schulpen TW, Wiznitzer M, Fedder H, Buitelaar JK (2007). Prevalence of psychiatric disorders among children of different ethnic origin. *Journal of Abnormal Psychology* **355**, 56–566.