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Early detection of psychosocial problems in adolescents

How useful is the Dutch short indicative questionnaire (KIVPA)?

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Background: Psychosocial problems, such as behavioural, emotional, and educational problems, are highly prevalent among children and adolescents. Early treatment may reduce these problems, if accurately identified. Validated questionnaires may support identification. The aim of this study is to assess the psychometric qualities of such a questionnaire, the Short Indicative Questionnaire for Psychosocial problems among Adolescents (KIVPA,) and to determine whether it is suitable for and adds to the early detection of psychosocial problems among adolescents. Methods: Data came from a national sample of 1,440 Dutch adolescents, using the KIVPA, the Child Behavior Checklist (CBCL), and the Youth Self-Report (YSR). Of these, 1,248 provided data on all questionnaires (77.8%). The scale structure of the KIVPA was assessed; its sensitivity and specificity using CBCL, YSR and referral for psychosocial problems as criteria; and its contribution to detecting CBCL and YSR problems. Results: The KIVPA is mostly uni-dimensional but the variance explained by its main factor is relatively low. The total KIVPA score discriminates between adolescents with and without problems on the three criteria. Using a clinical YSR total problem score as criterion, sensitivity and specificity are 0.82 and 0.85, respectively, at the proposed cut-off (area under the ROC curve: 0.92; 95% confidence interval (CI) 0.90–0.95). The odds ratio of a clinical YSR score for an elevated KIVPA score is 29.1 (95% CI: 14.4–59.1), although the KIVPA mainly covers internalizing problems. Conclusion: The KIVPA has added value in the early detection of internalizing psychosocial problems, but is not sufficiently efficient.

Keywords: adolescent behaviour, epidemiology, mass screening, mental health, questionnaire

Psychosocial problems, such as behavioural, emotional, and educational problems, are highly prevalent among children and adolescents, and may severely interfere with everyday functioning. Only a minority of the children with such problems receive mental health care.[1–4] In a study conducted among more than 2,000 Dutch children,[4] only 13% of the children with behavioural and emotional problems had been referred to mental health services in the year before the assessment.

In the Netherlands, preventive child healthcare is one of the most important low-threshold services for the early detection of psychosocial problems in children.[5] This preventive healthcare is systematically offered to all children living in the Netherlands by community physicians and nurses working in preventive Child Healthcare services (Child Health Professionals, CHPs).[6,7] As part of this system, more than 90% of all children undergo three to four assessments by a CHP during their school careers, in both primary and secondary school.[8] At present, new legislation has been started to support this system and the identification of psychosocial problems as part of it.[5]

We previously reported on the degree to which Dutch CHPs identified and managed psychosocial problems in children aged 4–15 years.[9,10] One or more psychosocial problems were identified in 25% of all children, and one in five of the identified children were referred for further diagnosis and treatment. Results further showed that identification of psychosocial problems in children and subsequent referral were six times more likely in the 8% with serious parent reported problem behaviour (measured by the Child Behavior Checklist,[11,12] a well-validated questionnaire for emotional and behavioural problems). However, CHPs identified no psychosocial problems in 43% of these children and therefore undertook no action. On the basis of this it was concluded that screening for psychosocial problems may be a promising option to reduce these problems, but that accuracy of the identification should be enhanced.[9,10]

One way to improve the early identification of mental health problems in children and adolescents may be the use of validated questionnaires. For instance, a meta-analysis by Durlak and Wells[13] shows that early treatment

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is much more effective if cases are identified in such a way. In the Netherlands, a number of questionnaires have been developed to this end in preventive child health care.[5,14,15] Such questionnaires should, of course, have good psychometric properties and should also be short: usually only ten minutes are available for the routine health assessment of a child, and mental health is only part of the assessment.

One of the questionnaires used is the Short Indicative Questionnaire for Psychosocial problems among Adolescents (abbreviated in Dutch as KIVPA).[14,16,17] The KIVPA aims at the detection of psychosocial problems in 12–18-year-old adolescents. Adolescents have to complete it in class or at home before their routine health assessment. The KIVPA has been developed by a working group of Dutch CHPs and epidemiologists. It consists of three parts, each with a different background: A) an indicative scale (for mental health; eight items); B) a psychosomatic scale (nine items);[18] C) a self-analysis scale (forteen items). Answers on scale A and C are dichotomized (0/1), on scale B they are 0/1/2 coded. A summary score ranging from 0 to 21 is computed on the basis of a weighing of each part. Items and formula for this score are presented in *table 1*.

A first validation study examined the psychometric quality of the questionnaire among 3,405 adolescents who were examined routinely. Their KIVPA scores were compared with those of 317 adolescents questioned during the intake for ambulatory mental health care.[14,17] Results show that mean scores of the first group were much lower than those of the second group. The authors propose a cut-off point of 6 and higher to be indicative of psychosocial problems. At this cut-off, 17% of the first group have an elevated score compared with 70% of the second group. In the first group, elevated scores occur far more often among girls than boys (23% vs 10%). Further information on the total score is lacking, however, a fact that has been criticized.[19,20] Despite this, at least half of all regional Dutch departments for preventive child healthcare use the KIVPA at present (C. de Rover, written personal communication) and it is mentioned as such in the Dutch listing of Basic Tasks for preventive child healthcare.[5]

The aim of the present study is to assess the psychometric qualities of the KIVPA and whether it is suitable for and adds to the early detection of psychosocial problems among adolescents.

METHODS

This study is based on a community sample of adolescents for whom data are available regarding the KIVPA, the CBCL, the Youth Self-Report (YSR) and the identification and management by a CHP.

Population

The sample was obtained using a two-stage selection procedure. In the first stage, a random sample of 19 of the 63 Child Healthcare Services was drawn, after stratification by region and degree of urbanization of their district. In the second stage, each Healthcare Service provided a sample of 75 children from the second grade of secondary school by inviting all children in three school classes of different levels to participate. Of the total sample of 1,604 eligible adolescents, 1,440 participated, 1,326 provided complete data on the KIVPA, and 1,248 on all questionnaires (89.8, 82.7, and 77.8% of the original sample, respectively; of all *participating adolescents*, 89.9% filled out the KIVPA). All three aforementioned groups were representative of the total sample, selective non-response was not found (on non-participating adolescents, data regarding gender, age, living area, ethnicity and mental health history were obtained from CHP files). Details have been presented elsewhere.[9,10] Analyses were restricted to those adolescents who provided data on all questionnaires, to make interpretation easier.

Data collection

The data were collected in a standardized way during routine preventive health assessments, from October 1997 to June 1998. The design of the study had been approved by the local Medical Ethical Committee. The KIVPA,[14] the YSR,[21,22] and the CBCL,[11,12] were mailed to adolescents, along with the standard invitation to the preventive health assessment. Adolescents completed the KIVPA and the YSR and put them in a sealed envelope; parents did the same with the CBCL. Adolescents gave both envelopes to the CHP who passed them on to the researchers without opening them (whereas normally, the CHP would partially base the interview on the KIVPA). The CHP interviewed the child (and sometimes the parents; 11% were accompanied by a parent) regarding mental health and background and examined the child. After each assessment, the CHP filled out the following question: 'Does the child have a psychosocial problem, at this moment?' (yes, no), and scored its severity (mild, moderate or severe) and the type of the problem(s) identified, using a pre-coded list. Children who had only risk-indicators for the development of psychosocial problems, such as parents with psychiatric problems or other family problems, had to be coded as 'no'.

The YSR and the CBCL were used respectively to assess adolescent's and parent's report of the behavioural and emotional problems of the adolescent during the preceding six months. Both questionnaires are of a similar nature, but are worded differently. Their (good) reliability and validity have been established.[11,12,21,22] For this article we used only the problem items of both questionnaires and computed scores for nine syndrome subscales, two broad-band groups of syndromes designated Internalizing and Externalizing, and a Total Problem score. Regarding the Total Problem and broad-band scales, adolescents were also allocated to a normal range or a clinical range, using the 90th percentile of the Dutch normative sample as cut-off.[12,22]

Analysis

In the analysis the psychometric properties of the KIVPA and its added value in identifying psychosocial problems

were assessed. Regarding psychometric properties, first the scale structure of the questionnaire was assessed using principal component analysis (PCA) and the internal consistency of each scale was computed. Regarding this, the approach proposed by the developers was followed. Next, the validity of the KIVPA was assessed by using dichotomized (normal vs clinical) CBCL and YSR (Total Problem and Internalizing/Externalizing scales), and being referred because of psychosocial problems by the CHP, as criteria.[23]

Regarding the added value of the KIVPA in identifying psychosocial problems, the odds of identification of mental health problems (i.e. a clinical YSR and CBCL Total Problem score) by an elevated score on the KIVPA was assessed. This was repeated with adjustment for social and demographic risk indicators which are known to the CHP and might help him or her to identify psychosocial problems,[9,10] and for adolescents with and without CHP-identified problems. Regarding social and demographic risk indicators, adolescents with missing data were

Table 1 Results of four principal component analyses, presenting the loadings of the items on the main principal component from analyses of (a) all items of the KIVPA,[a] (b) the items of only the Indicative subscale, (c) the items of only the Psychosomatic subscale, and (d) the items of only the Self-analysis subscale (n=1.248)[b]

	(a)	(b)	(c)	(d)
Indicative subscale				
What do you think of your own health?	0.50	0.62		
How do you feel when you're at home?	0.50	0.66		
Do you find it easy to talk with your parents or caretakers easily?	0.47	0.65		
Do you worry about the future?	0.47	0.51		
Do you think that you have a sufficient number of friends?	0.40	0.41		
Are you happy about your apperance?	0.45	0.52		
Have you ever had a sexual experience with someone against your will?	0.16	0.25		
Have you recently felt so restless or agitated that you took a sedative or hypnotic because of that?	0.23	0.32		
Psychosomatic subscale				
Do you sometimes feel listless? (not feeling up to anything)	0.45		0.55	
Do you sometimes feel weary without knowing why?	0.51		0.66	
Do you sometimes have a headache because of stress?	0.45		0.54	
Does it happen sometimes that you do not feel like eating?	0.32		0.47	
Do you find it difficult to fall asleep?	0.44		0.54	
Do you have a sensitive skin so that you easily get rash, spots or itch because of something?	0.26		0.34	
Do you sometimes have stomach-ache, around your navel?	0.42		0.55	
Do you sometimes feel that you cannot relax your muscles properly?	0.47		0.56	
Do you sometimes burst out crying although there is not much reason for it?	0.53		0.58	
Self-analysis subscale				
I feel good about myself[c]	0.33			0.34
I am rebellious or disobedient	0.30			0.27
I often feel unsure of myself	0.62			0.69
I worry a lot	0.64			0.68
I am independent[c]	0.20			0.28
I am often short-tempered or aggressive	0.33			0.34
I am often nervous or tense	0.51			0.55
I am a happy person[c]	0.38			0.39
I am close-mouthed, withdrawn	0.51			0.62
I often feel lonely	0.60			0.67
I am very shy	0.34			0.43
I am spontaneous[c]	0.21			0.26
I often feel down or depressed	0.65			0.68
I like to do a lot of things[c]	0.16			0.17
Internal consistency (Cronbach's alpha)	0.84	0.57	0.68	0.73
Percentage of total variance explained by first principal component	18.9	26.3	28.9	23.9

a: A KIVPA Total score is obtained by summing the scores of the three subscales according to the following formula (Indicative subscale + (sumscore Psychosomatic subscale / 3) + (sumscore Self-analysis subscale / 2)).
b: KIVPA = Short Indicative Questionnaire for Psychosocial problems among Adolescents.
c: Items are coded in reverse for computing the sumscore.

retained in the logistic regression models by creating separate dummies for the missing category of each variable. As this may lead to biased results,[23] all analyses were repeated , omitting all adolescents with missing data on these variables (remaining sample: 1,064 adolescents). Because the latter results were very similar, we do not present them here.

All analyses were made with SPSS 10.0 for Windows,[24] and were repeated for boys and girls separately. Results for these subgroups are given only when they differ significantly ($p<0.05$).

RESULTS

Close to 20% of the sample had a score on the KIVPA of 6 and higher. In general, girls have higher scores on the KIVPA than boys, on the Total scale and all subscales (compare *table 2)*.

Structure of the questionnaire and reliability

The exploratory PCA on the Total KIVPA yielded eight components with eigenvalues higher than 1, of which one dominates (eigenvalues: 5.9, and ranging from 1.1 to 1.3, respectively). This implies that it mostly measures one construct. The proportion of the variance (i.e. the variation in answers) explained by this construct is rather low, however. The same holds for the loadings of some items (i.e. their association with this construct): see *table 1*. Repetition of this analysis with a specified number of three components did not confirm the postulated three subscales, with either varimax rotation or with oblique rotation.

Next, the items from the three parts of the questionnaire were analysed separately (i.e. a PCA was performed on the items of the Indicative subscale, of the Psychosomatic subscale and of the Self-analysis subscale, respectively: see *table 1)*. This yielded one dominating principal component for the Psychosomatic subscale (eigenvalue: 2.6), but two for the Indicative subscale (eigenvalues 2.1 and 1.1), and four for the Self-analysis subscale, of which one dominates (eigenvalues: 3.3, and 1.3 to 1.0, respectively). The first principal components of the three subscales were also reasonably associated (correlation coefficients from 0.52 to 0.62), which indicates that they measure a rather similar construct. Measures of reliability were generally higher for girls than for boys.

Though the developers proposed a PCA on the dichotomized responses, all analyses were repeated on the original three-digit responses. This only marginally affected results regarding the factor structure, but results regarding reliability generally worsened (for the Indicative subscale, Cronbach's alpha dropped to 0.19).

Validity

The validity of the KIVPA was assessed using the CBCL, the YSR and the fact of being referred by the CHP because of psychosocial problems (without knowledge of the KIVPA score) as criteria. Mean KIVPA Total scores were higher for adolescents with a clinical Total Problem score on the CBCL and YSR, for all adolescents and for those not under mental treatment by mental health services. They were also higher for the referred group *(table 3)*.

Subsequently, the degree to which the score on the KIVPA is indeed elevated in the case of psychosocial problems as measured by these three criteria (i.e. sensitivity), and the degree to which it is 'normal' in the case of absence of these problems (i.e. specificity) were assessed. Using the YSR as criterion, the KIVPA score is elevated for 82% of the adolescents with a clinical YSR

Table 2 Descriptive statistics on the KIVPA Total scale and the KIVPA subscales, overall and by gender (n=1.248)

	Total	Indicative	Psychosomatic	Self-analysis
All (n=1,248)				
Mean (SD)	3.81[a] (2.88)	1.05[a] (1.29)	4.39[a] (2.70)	2.49[a] (2.38)
Median	3[b]	1[b]	4[b]	2[b]
Range	0–17	0–7	0–14	0–13
90th percentile value	8	3	8	6
Score 6 and higher	19.6%[c]	–	–	–
Boys (n=597)				
Mean (SD)	3.22 (2.48)	0.87 (1.13)	3.67 (2.40)	2.15 (2.16)
Median	3	0	3	2
Range	0–17	0–7	0–11	0–13
90th percentile value	7	2	7	5
Score 6 and higher	12.9%	–	–	–
Girls (n=651)				
Mean (SD)	4.36 (3.10)	1.22 (1.40)	5.05 (2.79)	2.80 (2.52)
Median	4	1	5	2
Range	0–17	0–7	0–14	0–13
90th percentile value	9	3	9	6
Score 6 and higher	25.7%	–	–	–

a: Statistically significant differences by gender ($p<0.001$), t-test.
b: Statistically significant differences by gender ($p<0.001$), Mann-Whitney U-test.
c: Statistically significant differences by gender ($p<0.001$), chi-square test.

Total Problem score. The reverse, a normal KIVPA score among adolescents with a normal YSR score, holds for 85% of the adolescents. The latter implies that 15% of the adolescents with a normal YSR score have an elevated KIVPA score. As most adolescents have a normal YSR score (in this sample about 92%), this low percentage still implies that only a minority (28%) of all adolescents with an elevated KIVPA score have a psychosocial problem as measured by the YSR. This is labelled in *table 3* as the positive predictive value (of an elevated KIVPA score). For the three criteria, the sensitivity of the KIVPA at a cut-off of 6 ranged from 0.44 to 0.86 and its specificity from 0.83 to 0.86. Lowest values concern Externalizing scales. Areas under the receiver operating characteristic (ROC) curves ranged from 0.68 to 0.93 *(table 3* and *figure 1)*.

To gain further insight into the contents of the KIVPA, its associations with scores on all YSR syndrome scales were assessed, as these come from the same informant (the adolescent). Resulting (Spearman) correlation coefficients were highest for the Anxious/Depressed and Withdrawn syndrome scales (0.68 and 0.59, respectively) and for Attention Problems and Identity Problems (only boys) (both 0.52). The first two of these are both part of the Internalizing broad-band of the YSR (for the third syndrome that is part of the Internalizing broad-band, Somatic Complaints, it was 0.49). Correlation coefficients for the other syndromes ranged from 0.46 to 0.37 (by decreasing value: Aggressive Behaviour, Social Problems, Thought Problems and Delinquent Behaviour), the first and the last constituting the Externalizing broad-band.

Finally, an elevated score on the KIVPA seems to add to the identification of psychosocial problems as measured by a clinical score on the CBCL and the YSR. In *table 4*, odds ratios are presented which express the likelihood of a clinical score on these questionnaires if an adolescent has an elevated score on the KIVPA. Odds ratios are much higher, however, for the YSR, and for internalizing problems. Adjusting for background characteristics of the adolescent, which may help the CHP in identifying psychosocial problems, increased some of the odds ratios. This indicates that the KIVPA indeed provides additional information that is helpful for identification. Furthermore, some odds ratios were higher for adolescents in

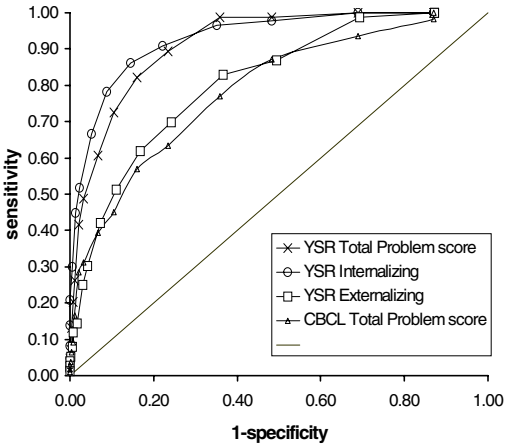

Figure 1 Receiver Operating Characteristic curves for the Total KIVPA score using the YSR Total Problem, Internalizing and Externalizing scales and the CBCL Total Problem score as criteria

Table 3 Test characteristics of the KIVPA, using the CBCL, the YSR and being referred because of psychosocial problems, as criteria. Rank correlation coefficients, and sensitivity, specificity, positive and negative predictive value, and area under the receiver operating characteristic (ROC) curve at a cut-off of the KIVPA of 6 and higher

	Spearman correlation	Mean KIVPA for cases	Sensitivity	Specificity	PPV	NPV	AUC	95% CI
CBCL								
Total Problem score	0.41*	7.08** [a]	0.57[c]	0.84[e]	0.25	0.95	0.79	0.74–0.83
Total Problem score, not under treatment	0.40*	6.94** [a]	0.55[c]	0.84[e]	0.23	0.94	0.78	0.73–0.83
Internalizing	0.43*	7.22**	0.63	0.84[e]	0.26	0.96	0.81	0.77–0.86
Externalizing	0.30*	5.68** [a]	0.44[d]	0.84[e]	0.26	0.92	0.68	0.64–0.73
YSR								
Total Problem score	0.70*	9.08** [a]	0.82[c]	0.85[e]	0.28	0.99	0.92	0.90–0.95
Total Problem score, not under treatment	0.69*	9.07** [a]	0.82[c]	0.86[e]	0.29	0.97	0.93	0.90–0.95
Internalizing	0.72*	9.36** [b]	0.86[d]	0.85[e]	0.31	0.99	0.93	0.91–0.96
Externalizing	0.48*	7.34**	0.62	0.83[e]	0.19	0.96	0.81	0.76–0.86
Referred because of psychosocial problems	–	7.04**	0.55	0.83[e]	0.12	0.98	0.77	0.70–0.84

* Statistically significant (p<0.001) differing from null.
** Overall mean 3.08; p-value of difference with other adolescents: <0.001, t-test.
a: Differences between cases (adolescents with a clinical score) and others are larger for girls than for boys (p<0.05; F-test in ANOVA).
b: Differences between cases (adolescents with a clinical score) and others are larger for girls than for boys (p<0.01; F-test in ANOVA).
c: Sensitivity is higher for girls than for boys (p<0.01; chi-square test).
d: Sensitivity is higher for girls than for boys (p<0.001; chi-square test).
e: Specificity is lower for girls than for boys (p<0.001; chi-square test).
PPV= positive predictive value; NPV = negative predictive value; AUC = area under the ROC curve; CI = confidence interval.

which the CHP, without knowledge of the KIVPA score, had not identified problems. This suggests that the KIVPA may, in particular, support the identification of problems not otherwise identified.

DISCUSSION AND CONCLUSIONS

The Short Indicative Questionnaire for Psychosocial problems among Adolescents (KIVPA) has been developed to support the identification of psychosocial problems by CHPs. This study examined some of its psychometric qualities, and assessed whether it is suitable for and adds to the early detection of psychosocial problems among adolescents in CHP practice. Results show that the KIVPA measures one dominant construct but contains several redundant items. Despite this, the Total KIVPA score discriminates between adolescents with and without problems as measured by CBCL, YSR and treatment status. Using the YSR as criterion, sensitivity and specificity are good. However, the KIVPA is most sensitive for internalizing problems, and scores on it are much higher for girls. Finally, most adolescents easily fill out the KIVPA and it provides additional information on the occurrence of psychosocial problems among adolescents, again mostly regarding internalizing ones.

Methodology

Methodological factors are unlikely to have affected these results. In general, response was very high (89.8%) and representative for the Dutch population, and the same applied to the adolescents for whom all data were available (77.8%). Regarding validity, two well-validated questionnaires were used as criteria, the CBCL and the YSR, as well as information on referral by professionals. Because of complexity and high costs, structured clinical interviews such as the Diagnostic Interview Schedule for Children were not used as criterion.[25] This might have provided additional information, but seems to be rather similar to questionnaire-based information.[26] Finally, this study mostly concerned adolescents aged 13 and 14 (89%) who filled out the KIVPA at home. The original validation study partially concerned adolescents who filled it out in class (47%). This latter group reported more problems, according to the authors partially due to a much higher mean age (58% aged 15–18 years).[14] It is unlikely, however, that the inclusion of this latter group in this present study would yield different findings.

Usefulness for CHP practice

The usefulness of the KIVPA depends on three factors: its psychometric properties, its suitability in daily practice, and its added value regarding the detection of psychosocial problems among adolescents. Regarding psychometric properties, the KIVPA seems to be a one-dimensional construct but its main factor explains relatively little (18.9%) of the overall variance and 12 of its 31 items have low loadings (<0.40) on this factor, i.e. are redundant. Restriction to the other 19 items yields a similar reliability of the first component as for 31 items (0.83 vs 0.84), which is acceptable,[27] and comparable with other questionnaires of similar size such as the Strengths and Difficulties Questionnaire.[28,29] Furthermore, the results of PCA, although very similar to those presented by the authors,[17] do not support the empirical existence of three separate dimensions within the concept

Table 4 Added value of the Total KIVPA score in detecting mental health problems as measured by the CBCL and YSR, measured by the odds ratio (OR) for a clinical CBCL or YSR score in the case of an elevated KIVPA score. Crude OR and OR after adjustment for relevant socio-demographic characteristics (Adj.[a]), for all children and for children with and without CHP-identified mental problems; non-treated sample n=1,226

	All children				Children without CHP identified problems				Children with CHP identified problems			
	Crude OR	95% CI	Adj.[a] OR	95% CI	Crude OR	95% CI	Adj.[a] OR	95% CI	Crude OR	95% CI	Adj.[a] OR	95% CI
CBCL												
Total Problem score	6.59	4.29–10.13	6.87	4.37–10.81	5.41	2.98–9.81	5.17	2.74–9.78	4.07	2.06–8.03	5.04	2.41–10.56
Internalizing	8.32	5.31–13.05	9.94	6.13–16.14	8.86	4.77–16.44	10.76	5.49–21.12	3.71	1.87–7.35	4.77	2.24–10.17
Externalizing	3.78	2.58–5.54	4.18	2.79–6.28	3.74	2.00–5.69	3.70	2.12–6.49	2.60	1.22–4.19	2.64	1.37–5.12
YSR												
Total Problem score	26.70	14.89–47.85	32.38	17.09–61.36	24.64	12.05–40.50	27.30	12.66–58.90	18.18	6.20–53.35	35.87	8.21–156.8
Internalizing	35.61	18.88–67.18	57.96	28.01–120.0	34.20	14.62–80.02	53.41	20.51–139.1	18.66	7.02–49.65	37.65[b]	10.73–132.1
Externalizing	8.28	5.07–13.53	8.72	5.20–14.63	7.48	4.17–13.42	7.54	4.06–14.01	12.02	3.47–41.57	19.58[c]	4.26–90.10

OR = odds ratio; CI = confidence interval

a: Adjusted for the following characteristics (between brackets categories and numbers of adolescents): gender (boys/587; girls/639), age (11–13 years/752; 14–16 years/474), at least one parent Dutch-born/1,156; other/70; family situation (two parents/1,103; one parent/108; other/15), number of siblings (one or more/1,136; none/87; unknown/3), parental educational level ((very) low/439; higher/635; unknown/152), parental employment status (at least one parent works >16 hours per week/1,150; other/66; unknown/10); urbanization (not or mildly urbanized/969; (very) urbanised/251; unknown/6).

b: Higher added value in girls (p=0.004, change in deviance (–2log likelihood) between models with and without interaction of gender and KIVPA score, which follows a chi-square distribution).

c: Higher added value in girls (p=0.004, change in deviance (–2log likelihood) between models with and without interaction of gender and KIVPA score, which follows a chi-square distribution).

measured by the KIVPA. The most likely explanation for this finding is that the questionnaire has not been developed to enable the discrimination of separate problem areas. Results do not support the weighting of items in the different subscales as advised by the authors. Moreover, the contents of the questionnaire focus on internalizing problems. Correlation coefficients with both the YSR and CBCL are far better for this type of psychosocial problem than for externalizing problems; the latter may even be partially due to the fact that both types of problems sometimes occur together, diagnostic co-morbidity.[30] The focus of the KIVPA on internalizing problems may also explain most of the differences observed between boys and girls. Additionally, KIVPA scores are in general associated more strongly with YSR scores than with CBCL scores. However, this can easily be explained by the well-known differences in information on the mental health of children that is provided by parents and children themselves.[31,32]

Differences between informants may also explain the more favourable results with the YSR than the CBCL regarding criterion validity. At the proposed cut-off of 6, validity and sensitivity are satisfactory with the YSR as criterion whereas they are rather low with the CBCL. At this cut-off, 99% of adolescents with a KIVPA score in the normal range also have a normal YSR score. However, only 28% of adolescents with an elevated total KIVPA score have a clinical YSR Total Problem score (and even less regarding externalizing problems). Thus the majority of the adolescents with an elevated total KIVPA score will be false positives. This shows that information on KIVPA scores can be used only in conjunction with other (clinical) information.

Regarding suitability, the KIVPA seems to be satisfactory. In this study, almost all (89.9%) participating adolescents filled it out completely. Moreover, previous studies show that CHPs can work with it quite well, and that filling it out and interpreting it takes little time (5–10 minutes and 2–3 minutes, respectively).[17] Finally, the information regarding the Total KIVPA score adds to the identification of psychosocial problems, especially internalizing ones, and interestingly it works best for adolescents in whom the CHP did not identify psychosocial problems.

In conclusion, the KIVPA appears to be suitable for CHP practice and to add to the identification of internalizing psychosocial problems. However, the questionnaire contains some redundant items and its cut-off needs further study, especially regarding differences by gender. The KIVPA may thus support the identification of internalizing psychosocial problems if its efficiency is improved. As such, the development of the instrument seems to have been guided mainly by the problems in CHP practice regarding the identification of psychosocial problems, and not *a priori* by a solid psychometric starting point (which has for instance guided the development of the CBCL). Crucial for the early detection of psychosocial problems is a solid clinical approach in daily CHP practice combined with a solid psychometric approach. Regarding the latter, an approach based on item response theory could lead to an improvement of the KIVPA in its present format.[33]

When using the KIVPA, the CHP needs additional sources of information for an appropriate assessment of externalizing psychosocial problems. In general, psychosocial problems cannot be identified solely on the basis of the KIVPA, without proper assessment of the adolescent by a professional, but neither can they on the basis of any other existing questionnaire.[34]

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