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Child Abuse & Neglect

Risk assessment of parents' concerns at 18 months in preventive child health care predicted child abuse and neglect

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ABSTRACT

Objective: As child maltreatment has a major impact, prevention and early detection of parenting problems are of great importance. We have developed a structured interview which uses parents' concerns for a joint needs assessment by parents and a child health care nurse, followed by a professional judgment on the risk level of future parenting and developmental problems: the Structured Problem Analysis of Raising Kids (SPARK). Previous results have shown that the risk assessment of the SPARK is associated with risk factors for child maltreatment. This study reports the predictive value of the SPARK for reports on high impact parenting problems and child abuse and neglect.

Method: Cross-sectional study with a 1.5-year follow-up based on 1,850 18-month old children, living in Zeeland, a province of the Netherlands. Data on the SPARK were obtained in the period of June 2007 to March 2008. Outcomes of the SPARK were in October 2009 compared to reports of the Advice and Reporting Centers for Child Abuse and Neglect (ARCAN) and Youth Care Agency (YCA). Univariate and multivariate logistic regression analysis was done using the risk assessment, parents' concerns, the perceived need for support and known risk factors as predictors.

Results: The overall risk assessment of the SPARK is the strongest predictor for reports to ARCAN and YCA in the 1.5 years after completing the SPARK (odds ratio of high versus low risk: 16.3 [95% confidence interval: 5.2–50.8]. Controlling for the risk assessment, only the sum of known risk factors and an unemployed father remained as significant predictors. The reported groups differ significantly from the children without a report with regard to family characteristics, but not with regard to child characteristics.

Conclusions: A structured assessment of the concerns and care needs of toddlers' parents by a child health care nurse is a valuable predictor of reports on child abuse and neglect and serious parenting problems in toddlers.

Practical implications: Systematically exploring and evaluating parental concerns with an instrument like the SPARK can contribute to the early recognition of families at risk for major child rearing problems.

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Background and objectives

The well-being of young people in the Netherlands compared to other countries seems to be at a very high level (Unicef Innocenti Research Centre, 2007). Recent studies in the Netherlands, in which trained professionals in a variety of life

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domains reported the number of children that showed signs of child abuse and neglect, have however shown that the yearly prevalence of child abuse is comparable to that in other western countries, namely a yearly prevalence of 3% (Euser, Van Ijzendoorn, Prinzie, & Bakermans-Kranenburg, 2010). In these studies, child abuse is defined as physical, emotional and sexual abuse and emotional or physical neglect.

Child abuse and neglect have a long lasting impact on the child, its family and the following generations. Moreover, they are a burden for society as a whole. An effective approach of child abuse and neglect demands a multilayered and integrated approach (Hermanns, 2011; Stroud & Petersen, 2012; Widom, Czaja, Bentley, & Johnson, 2012). In addition to universal prevention (aimed at a whole population) and selective intervention (aimed at groups at risk), indicated prevention aimed at individual families at risk may offer an important contribution. Usually, cases for indicated prevention are found by population screening. However, reliable and valid screening instruments are needed for the accurate detection of individual children at risk of child abuse. This article focuses on the potential usefulness of the SPARK: Structured Problem Analysis of Raising Kids (Staal, van den Brink, Hermanns, Schrijvers, & van Stel, 2011) for such a screening.

In order to select families for indicated prevention purposes in screening for risk of child abuse and neglect, two strategies can be distinguished. The first is based on static risk factors, the second on dynamic risk factors such as parents' behavior. The latter are considered to be early signs or proxies of child abuse and neglect (CAN), for example mental health problems in parents or drug abuse. Nygren, Nelson, and Klein (2004) reviewed a number of these screening tests and procedures and found only one of the instruments to achieve good to fair results in a number of studies: the Kempe Family Stress Inventory (Korfmaier, 2000); relative risk 8.41 at 1 year of age and 5.19 at 2 years). In an earlier review (Peters & Barlow, 2003) the perinatally applied Dunedin Family Services Indicator too was found to be psychometrically valid in predicting child abuse and neglect over a 2-year period (sensitivity 100%, specificity 87.3% (Muir et al., 1989)).

An example of the 'proxy-approach' is the Child Abuse Potential Inventory (CAPI) (Milner, 1990) and a 20-item scale based on the CAPI (Grietens, Geeraert, & Hellinckx, 2004). The CAPI is a self-report scale containing 160 items on parental well-being and stress, problems in parent–child interactions and problems with social relationships. The CAPI has a low to moderate correlation with child abuse and neglect (Milner & Gold, 1994). In the scale of Grietens et al. (2004), parenting characteristics such as signs of parenting stress, social isolation and impulse control are rated by a home visiting nurse. A community-based sample of mothers scored significantly lower on the scale than mothers with substantiated child abuse or neglect.

None of the above mentioned instruments uses the joined perspectives and experience of both the parent(s) and professional. The focus in our study is on detecting risks and early signals by combining the perspectives from parents on their own child rearing and the evaluation of the child rearing situation by a professional: a child health care nurse.

In the Netherlands, the law prescribes to offer preventive child health care (CHC) for each child between 0 and 19 years and asks from the CHC to detect parenting and developmental problems at an early stage (Ministerie van VWS, 2002). The CHC includes the well-baby clinics and toddlers (0–4 years), primary and secondary school health care (4–19 years). They reach almost all children over a several-year period (Hermanns, Öry, & Schrijvers, 2005; IGZ, 2009) (0–4 years >95%; 5–13 years >90%). By reaching a large population of families with children, especially in infancy, CHC is in a position to contribute to the prevention of child abuse and to detect early signals of (potential) child abuse.

However, as the younger age group is concerned, there are no validated early detection instruments which cover both the child and its family environment.

The SPARK is a broad-scope structured interview on parenting and child-developmental problems. The SPARK integrates parental concerns with a joint needs assessment by parents and professionals, and includes a professional judgment on the risk level of future parenting and developmental problems. Defining problems and questions leads to support and guidance of parents, or in some cases referral to specialized care. It is meant for use in the general population. Although the SPARK was not specifically intended to measure the risk of child maltreatment, it is aimed at the problems in child rearing and family life in general. We found it important to explore the association between indicators of parenting problems and parenting risks in general, and later reports of child maltreatment. A number of studies show that the majority of risk factors for child abuse are non-specific and can be found in the daily life of parents and children, their characteristics and the social and physical context of their lives. It is often found that not the specific context of the risk factors, but the accumulation of risks and stressors is related to (later) child abuse and neglect e.g. (Brown, Cohen, Johnson, & Salzinger, 1998). This accumulation leads to deregulations of processes of child rearing and child development. These processes eventually heighten the risk for a number of child rearing and developmental problems, among which abuse and neglect (Bugental, 2009; Sameroff & Fiese, 2000). Child abuse and neglect thus can be seen as the outcome of a complex process in which risk factors in the child, the family and/or the social and physical context, increases the strain in the parent–child relationship. Early detection of an increasing strain in the parent–child relationship is therefore important. In this study, it is assumed that departing from the experiences and interpretation of the parents can be a valuable way to detect these risk processes.

Several authors support the opinion that an assessment of parents' concerns and their need for support should be done in dialog with the parents (Glascow, 2000; Glascoe and Marks, 2011; Puura et al., 2002). One of the main features of the SPARK is direct interaction between parent and professional: the focus is on interactively discussing with parents the child's needs and development and their needs for parenting support.

An additional advantage is that a screening that starts with taking the perspectives of parents is less threatening to parents and can be expected to increase the willingness of parents to participate in such a screening.

The development study with 1140 children showed that the SPARK is discriminative and practicable (Staal et al., 2011). Before the SPARK can be further implemented in clinical practice, further study is needed on the psychometric characteristics of this instrument.

In this article, we investigate the predictive validity of the SPARK, i.e., whether an assessment of a high or increased risk according to the SPARK correlates with a negative parenting outcome such as child abuse or neglect in the near future. The risk assessment of the SPARK is therefore compared to confirmed reports of child abuse and neglect to the Advice and Reporting Centers for Child Abuse and Neglect (ARCAN, in Dutch: Advies en Meldpunt Kindermishandeling, AMK) and also confirmed reports to the Youth Care Agency (YCA, in Dutch: Bureau Jeugdzorg, BJZ). Combined, these reports are the most objective estimate of the presence of child abuse and neglect (Jeugdzorg Nederland, 2011). The Dutch system is geared toward help on a voluntary basis by the YCA in order to help the family solve their problems. However, a voluntary application to the YCA is always followed by an extended investigation whether the family problems are serious enough to warrant referral to further professional care by Child Welfare or Mental Health Institutions. Referral to specialized care thus can be seen as evidence of serious family problems. If we only would have used ARCAN reports, we would have missed the confirmed reports with voluntary assistance.

Twelve ARCAN centers cover the Netherlands. Professionals and non-professionals can call upon these services for advice and/or report suspicions of child abuse. They receive advice on their possible (active) role and options or may formally report a suspicion of child maltreatment. After investigation of the report there are 3 main routes: to arrange access to care (youth care, mental health, social work, and parent support); to provide protection or reporting to the police and/or prosecutor.

Besides child abuse and neglect, there are other problems that may influence a child's safety, stability or development in a negative way. These problems may be caused by family conflict, problem behavior of children, social isolation of families or families where a family member suffers from physical or mental illness, addiction, or child disorders (i.e., disability or developmental problem). The presence of these adversities can lead to serious parenting problems. In this case, and if community-based services are not effective, families will usually be referred to the YCA or they may call and ask the YCA for advice or support themselves.

The study question is: What is the predictive value for child abuse and neglect, as evident from reporting to ARCAN or referral to the YCA, of the risk assessment of the SPARK, a structured interview between parent(s) and CHC professional about parental concerns?

Methods

This study is part of a validation study of the SPARK (van Stel, Staal, Hermanns, & Schrijvers, 2012). The sample for the validation study consisted of all children born between January 15 and July 31 2006, who received a SPARK at 18 months and at age 3 were still living in Zeeland, a province of the Netherlands. Data on the SPARK were obtained in the period of June 2007 to March 2008. Once a month, all children who would reach the age of 18 months the following month and actually were living in Zeeland were identified in the municipal population registry. This ensured that all eligible children, regardless of their use of services or care, were contacted. The SPARKs were obtained during a home visit by the CHC professional or during a visit to the well-baby clinic by parent and child, with the main goal of assessing parents' concerns and deciding together with the parent(s) which type of (health) care was needed by child and parent(s). The background of this procedure was that we wanted to compare the outcomes of the SPARK in a formal office setting and a familiar home environment.

Data on whether children in our validation sample were reported to the ARCAN and YCA were obtained by comparing the list of participating children with all children in the database of the provincial ARCAN and YCA, in October 2009. All children with a report before the age of 18 months were excluded from this study.

Prior to the start of this validation study, we tested the instrument on feasibility (Staal et al., 2011). In this test-phase, all CHC-nurses in Zeeland were trained in using the SPARK. Training consisted of a half-day session including explanation, watching a recorded interview, practising with the new instrument and a question and answering session with the development team. During the feasibility study, each team of CHC-nurses participated in 3 supervision sessions.

Informed consent

The SPARK is performed as part of routine care. Parents were requested (verbal and written) for informed consent to use the information recorded in the SPARK for scientific research. Approval for the validation study was obtained from the Medical Ethical Review Committee of the University Medical Center Utrecht. Because comparing the SPARK-results with reports to ARCAN and YCA were not specifically mentioned in the consent form, additional approval was asked and obtained from the Medical Ethical Review Committee. Approval to look up all children in our sample in the ARCAN and YCA-database was also given by the regional board of directors from the ARCAN and YCA. The researcher signed therefore a confidentiality statement the same as used for students' internship. Experience from other studies e.g. (Bouwmeester-Landweer, 2006) highlights that high risk families often drop out of studies due to refusal to participate in scientific research. As we wanted to ensure that our validation sample did not miss the children we aimed to find, we asked and obtained approval from the Medical Ethical Review Committee to use a limited amount of data from the 'no consent' group, in which the SPARK was administered according to protocol, including the risk assessment. Because of (a) the importance of the topic (child abuse), (b) the expectation that a disproportional part of high risk families would be present in the no consent group, and (c) that

no negative consequence for these families could be expected from using these data, as no information about the results of individual children was given to care providers, permission was granted to use the overall risk assessment of the SPARK made by the CHC nurse and registration in the ARCAN and YCA database in the study.

Instruments

The SPARK consists of a structured dialog with the parent(s) on 16 subject areas in the following order (Staal et al., 2011): infancy review (reviewing past issues and discussing any problems from the infant period that are still relevant); somatic health; motor development; language, speech and cognitive development; language use of parents (second language, mother tongue); emotional development; contact between the child and others (both children and adults); child behavior; parenting approach; developmental stimulation and early/pre-school education; how the child spends his/her time; living environment in and outside the home; social contacts and informal support; day-care for the child; concerns communicated by others; family issues; and lastly a question about whether any topic has been forgotten or needs further attention.

The SPARK uses a 3-step model: Step 1: detection of problems and concerns; Step 2: clarifying the characteristics and impact of problems and concerns in dialog with the parents and discussing needs for parental support; Step 3: analysis and a decision on what to do next. For each topic, the CHC nurse starts with a short description of the topic with examples, and asks the parents if they have experienced any concerns, questions or problems in the last 6 months (Step 1). Parents are requested to assess the impact of these concerns on a five-point Likert scale presented on a printed card, ranging from “no concern at all” to “very concerned”. If concerns are cited, respondents are asked to elaborate on the exact nature of concerns, questions or problems, and whether or not professional and/or informal help – if offered – has been sufficient. Each topic ends with the parents assessing their current perceived need for support, on a six-point Likert scale: (1) no help needed; (2) information wanted; (3) personal advice; (4) counseling; (5) intensive help; and (6) immediate intervention required. The CHC professional then makes the same assessment (Step 2). After all the subject areas have been covered, the CHC nurse discusses with the parents the amount and content of care needed (Step 3). Intensive help or immediate action mostly leads to a referral to professionals outside preventive CHC; while information wanted/personal advice/counseling are often done by the CHC nurse. The information of Steps 1–3 is recorded on a form with a matrix-structure: the first column includes all topics, followed by columns for each separate question. These three steps of the SPARK take on average 29 min [standard deviation = 11 min].

The CHC nurse ends the visit and subsequently makes an overall risk assessment, assigning the child a low, increased or high risk for parenting and child development problems. The CHC nurse bases this overall risk assessment on the information from the interview, and on an elaboration of factors that might positively or negatively influence the risk assessment. This structured elaboration on the last page of the SPARK includes the observed interaction between parent(s) and child(ren) and the observation of growth, development, manifest problems and living environment.

There were no pre-defined cut-offs for the risk assessment provided. During supervision sessions, inconsistencies between parents' concerns, perceived need for support and the risk assessment were discussed to clarify the process. The inter-rater reliability is reported elsewhere and was good to excellent with intraclass correlations between 0.85 and 1.0 for physical topics; between 0.61 and 0.8 for social–emotional topics and 0.92 for the overall risk assessment (van Stel et al., 2012).

All children in our validation sample were checked in the registries of ARCAN and YCA. For all children in the sample known with ARCAN or YCA the following data were recorded: date of report, type of reporter, date of finishing the report, and the conclusion on the report (i.e., whether the report or seriousness of the parenting problems were substantiated). Substantiation implies that the investigation indeed showed child abuse or neglect, or evidence of a serious parenting problem. To avoid duplication of reports, only the ARCAN registration was counted if a child was present in both registries.

Data-analysis

Descriptive statistics on the predictors were presented per risk group and per type of report, using Kruskal–Wallis and ANOVA. A nationwide study in the Netherlands showed that family characteristics played a more important role than child characteristics in use of YCA (Pommer, van Kempen, & Sadiraj, 2011). The association of the SPARK with the reports to the child protection services (both ARCAN and YCA) was assessed by binary logistic regression analyses (Garson, 2011). Univariate logistic regression analyses were performed using the following predictors: (a) the summary scores of the concerns and perceived need for support; The summary scores of the concerns and perceived need for support were computed by summing the scores for all subject areas and dividing by the number of areas, in order to present the scores on the same scale as used to for the different questions of the SPARK (Staal et al., 2011); (b) the risk assessment (low, increased, and high risk); (c) single ‘known risk factors’, from the demographic characteristics of the children in our sample (Kijlstra, Prinsen, & Schulpen, 2002; Sidebotham, Heron, & The ALSPAC Study Team University of Bristol, 2005) including large family (≥ 4 children), single parent, young parent (<20 years at birth of child), very low educational background of parents, parents not speaking Dutch at home, unemployed or unemployable parents; (d) a count score of these ‘known risk factors’; and (e) location of the interview (at home or at the well-baby clinic).

The conclusion about the report was labeled as follows: (a) confirmed child abuse and neglect (confirmed ARCAN report); (b) report under investigation; (c) confirmed serious parenting problems (no ARCAN report, because parents accept voluntary assistance from YCA professionals); and (d) non-confirmed report. Only confirmed reports (ARCAN and YCA) were used in this

Fig. 1. Flow chart with number of reports to ARCAN and YCA, and conclusion on the report, per risk group.

study. All variables which significantly ($p < 0.05$) predicted reporting to the child protection services (ARCAN and YCA) were selected for multivariate analyses and entered simultaneously. Only variables that remained significant in this multivariate analyses were reported. Because the SPARK is a broad-scope structured interview on parenting and child-developmental problems and not specifically intended to measure the risk of child maltreatment we presented also a closer look at the high risk group without a report to ARCAN or YCA with descriptive statistics. SPSS version 17 was used for the statistical analysis.

Results

During the study period 2012 eligible children were living in the province of Zeeland, see the flow chart (Fig. 1). Twenty-six children with a report before the age of 18 months were excluded from this study. No SPARK was received for 136 children (6.8%). Partly because parents were not or could not be invited for the regular check-up at the age of 18 months and partly because no SPARK was received by the research team. For another 49 children, an incomplete SPARK was available, i.e., consent or risk was not filled in by the CHC nurse. Furthermore, no consent was given for 102 children. The groups 'no consent' and 'incomplete' are taken together as 'other' in the flow chart. In this figure also the number of reports and conclusion per risk group are presented.

Population characteristics, only from the consent group, are presented in Table 1 per 'report' group, describing group differences between children with and without a report. The confirmed ARCAN and YCA report groups differed significantly from the group without a report in several of the known risk factors, such as family composition, education and employment status of the parents.

The risk assessment of the SPARK showed 2.5% high, 18.5% increased and 70.8% low risk children. The number of reports and conclusion on the report are presented in the flow chart (Fig. 1), separately per risk group. A closer look at the risk assessment of the SPARK of the 'no consent' group showed 9.8% high, 28.4% increased and 61.8% low risk. Also for this special group the number of reports and conclusion per time period and per risk group are presented, see Fig. 2. A closer look at the high risk group without a report to ARCAN or YCA showed that they differed in SPARK scores from the high risk group with a report. The children in the high risk group without a report ($n = 39$) especially needed help in developmental areas.

Table 1

Population characteristics (data only from the consent group), per 'report' group.

	No report (n = 1,662)	Confirmed ARCAN (n = 10)	Confirmed report YCA (n = 14)	p-Value ^a
Child characteristics				
Male/female	53%/47%	40%/60%	71.4%/28.6%	0.6
Place in family order:				0.07
First child	41.7%	20%	28.6%	
Second child	36.8%	30%	42.9%	
Third child	13.7%	20%	21.4%	
Fourth or younger child	7.8% (max 12 children)	30% (max 6 children)	7.1% (max 4 children)	
Family characteristics				<0.001
2-Parent household	93.9%	30%	78.6%	
1-Parent household	2.3%	30%	21.4%	
Shared household	2.5%	30%	–	
Other (foster family/adoption/divorcement/grandparents)	1.3%	10%	–	
Parent characteristics				
Age mother (mean in year, sd)	30.6 (sd 4.8)	30.4 (sd 5.3)	28.9 (sd 5.4)	<0.001
Mother aged <20 at birth of this toddler	0.8% (n = 13)	–	7.1% (n = 1)	
Age father (mean in year, sd)	33.4 (sd 5.7)	35.2 (sd 5.5)	35 (sd 7.8)	0.1
Father aged <20 by birth of this toddler	0.4% (n = 6)	–	–	
Ethnicity: non-Dutch mother	8.6%	30%	35.7%	<0.001
Ethnicity: non-Dutch father	7.7%	10%	28.6%	<0.001
Language: non-Dutch used at home by mother	9.1%	20%	28.6%	<0.001
Language: non-Dutch used at home by father	7.3%	10%	21.4%	<0.01
Education				<0.001 mother <0.001 father
Low education	18.2% mother (incl. 1.9% very low) 20.2% father (incl. 1.6% very low)	90% mother (incl. 10% very low) 80% father (– very low)	28.6% mother (incl. 21.4% very low) 50% father (incl. 14.3% very low)	
Intermediate education	53.2% mother 51.4% father	– mother 20% father	64.3% mother 21.4% father	
High education	28.6% mother 28.4% father	10% mother – father	7.1% mother 28.6% father	
Employment				
Employed	73.8% mother 94% father	20% mother 80% father	50% mother 64.3% father	<0.001 mother <0.001 father
Unemployed	0.9% mother 0.5% father	10% mother 10% father	7.1% mother 21.4% father	<0.001 mother <0.001 father
Unemployable/unable to work	0.4% mother 0.9% father	– –	– –	<0.001 mother 0.99 father
Housewife/house husband	24.6% mother 0.7% father	70% mother –	35.7% mother –	<0.01 mother 0.99 father

^a Using Kruskal–Wallis test, with exception of age: using ANOVA.

The most reported factors by the CHC nurse which negatively influenced her/his risk assessment in this group were difficult infant period experienced by parents (76.5%), developmental delays/physical health problems of the child (75%), psychiatric problems of parents (70.6%) and the competence of parents (60.7%). In the high risk group with a report ($n = 8$), the most reported negative factors by the CHC nurse were the competence of parents (75%), less social support (62.5%), difficult infant period experienced by parents, parents disagree, interaction/exemplary behavior between parent and child and speech and cognitive development of the child (all 50%).

Both the information obtained by the SPARK (parents' concerns, perceived need of support and risk assessment) and known risk factors were strong and significant predictors of a report in the univariate analysis (see Table 2). Most variables which were significant predictors in the univariate analysis, did not remain significant in the multivariate model (see Table 3). The risk assessment of the CHC nurse was by far the strongest predictor for a report to ARCAN and YCA. After controlling for the overall risk assessment of the CHC nurse, only the variables 'unemployed father' and the sum of known risk factors for child maltreatment remained significant predictors (see Table 3). Location of the interview did not influence prediction of a confirmed report ($p = 0.95$). The total explained variance of the model was low.

Fig. 2. Flow chart of the no consent group, with number of reports to ARCAN and YCA, and conclusion on the report.

Table 2

Odds ratios (95% CI) and *p*-value of predictors for a report to ARCAN or YCA in the univariate logistic regression analysis.^a

	OR [95% CI] for report versus no report	<i>p</i> -Value
Parents' concerns	3.8 [2.0–7.2]	<0.0001
Perceived need of support (parent assessment)	6.8 [3.2–14.4]	<0.0001
Perceived need of support (professional assessment)	9.0 [4.5–18.0]	<0.0001
Overall risk assessment professional		
High risk	33.1 [13.9–79.1]	<0.0001
Increased risk	8.1 [3.9–16.8]	<0.0001
Single risk factor		
Low education mother	4.1 [1.4–12.1]	0.010
Low education father	4.3 [2.2–8.1]	<0.0001
Mother unemployed	14.4 [5.0–41.4]	<0.0001
Mother unemployable/unable to work	20.6 [5.0–85.2]	<0.0001
Father unemployed	26.6 [9.2–76.6]	<0.0001
Sum of risk factors		
1 risk factor	4.2 [1.7–10.3]	0.002
2 risk factors	6.3 [2.5–16.2]	0.0001
3 risk factors	13.4 [5.2–34.7]	<0.0001
4 risk factors	12.7 [3.2–50.2]	0.0003
5 risk factors	26.3 [6.3–108.8]	<0.0001

^a Only significant predictors are reported.

The odds ratio for high risk versus low risk was 16.3 (95% confidence interval 5.2–50.8; see Table 3). Despite this high odds ratio, only 27% of all reported children were assessed as 'high risk' with the SPARK. This is partly caused by the low number of children with an assessment of high risk. Another 38% of the reports were in the group with increased risk, 18% in the group with low risk, and 17% in the 'other' group.

The specificity and negative predictive value of both high and increased risk for a report to ARCAN or YCA were very high (high risk: 0.97 and 0.99, increased risk: 0.80 and 0.99, see Table 4). Sensitivity was moderate.

Table 3Odds ratios [95% CI] and *p*-value of predictors for a report to ARCAN or YCA in the multivariate logistic regression analysis.^a

Odds ratios	Reports between 18–36 months	<i>p</i> -Value
OR high risk	16.3 [5.2–50.8]	<0.001
OR increased risk	4.4 [1.9–10.3]	<0.001
OR father unemployed	6.0 [1.4–25.5]	0.015
OR sum of risk factors (range 1–5 risk factors)	OR ranging from between 2.9 [0.98–8.88] (2 risk factors) to 6.6 [0.98–44.5] (5 risk factors)	0.001–0.18
Nagelkerke's R ²	0.24	

^a Numbers used in analysis: see Fig. 1.**Table 4**

The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the risk assessment for a report to ARCAN or YCA.

	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
Increased risk	0.69 (0.5–0.84)	0.80 (0.78–0.81)	0.06 (0.04–0.09)	0.99 (0.98–0.99)
High risk	0.52 (0.3–0.74)	0.97 (0.96–0.98)	0.19 (0.1–0.32)	0.99 (0.98–0.99)

Discussion

This study assesses the predictive validity of the SPARK, a structured interview by the child health care professional (CHC) with parent(s) about parental concerns. Structured assessment of concerns and care needs of toddlers' parents by a CHC nurse appears to be a strong predictor of reports on child abuse and neglect in the time window of 1.5 years following the assessment. Using the strong points of preventive child health care – high reach and the low barrier for parents to talk about a broad range of topics – resulted in a high response rate. The risk assessment of the CHC nurse, after elaboration of the information obtained by the SPARK, showed to be a good summary, as most predictors that were significant in univariate analysis disappeared in the multivariate analysis. After controlling for the risk assessment, only an unemployed father and the sum of known risk factors for child maltreatment remained significant predictors.

This study is part of a larger study on the validity of the SPARK in detecting parenting and child development problems in the general population. Predictive validity could be assessed only partially using the ARCAN and YCA registries, as the SPARK has a broad scope and was meant for use in the general population, not for predicting CAN. Therefore, we are mainly interested in specificity. The high specificity implies that an assessment of low risk is correct in the majority of children. The low explained variance of the prediction model was expected, as most children are doing well. And if there are problems, a large portion of the care needs of parents can be addressed by pediatricians, general practitioners, paramedics and predominantly by CHC itself (about 80%) (Staal et al., 2011; Zeijl, Crone, Wiefferink, Keuzenkamp, & Reijneveld, 2005). This also partly explains why not all 'high risk' assessments result in a report to ARCAN or YCA.

The population characteristics of this study give insight into the way the reported groups differ from the children without a report. The confirmed ARCAN and YCA report groups differed significantly from the group without a report in several of the known risk factors, such as family composition, education and employment status of the parents, as was found in other studies on child maltreatment (Alink et al., 2011; Ijzendoorn van et al., 2005; Pommer et al., 2011; Sidebotham et al., 2005).

In population screening, a high coverage is important. The high reach of preventive CHC in the Netherlands (Shuller et al., 2004) and our goal to reach all eligible children resulted in a high response rate, with 6.8% no contact at all. Despite the expected high response rate, we anticipated that non-responders (no consent or missing) may have increased risk. Therefore, we requested permission from the Medical Ethical Review Committee to use a limited amount of data from the no consent group. For this group the CHC nurse followed the SPARK protocol and gathered the information to complete the risk assessment in the same way as the consent group. Indeed, more high and increased risk and a large proportion of the confirmed ARCAN reports were in the no-consent group, emphasizing the need to put effort in reaching all children.

The SPARK has a different working method from most other instruments used to detect parenting and child-development problems. The focus is mainly on interactively discussing with parents the needs of the child and their needs for parenting support. Decisions about future care are taken together. In our opinion, this non-threatening way of talking with the parents works very well, as is shown by the very high response rate and the association of SPARK results with child abuse and neglect. Further research is needed whether the SPARK performs better or worse than other instruments for detect parenting and child-development problems, or that the SPARK should be used in combination with other instruments.

Although the SPARK covers a broad domain of family and child functioning and does not have an explicit focus on risks of child abuse and neglect or on proxies of abuse and neglect in the behavior of caretakers, we assumed an association between an increased risk of parenting problems and reports of child maltreatment. Still, the strength of the relation between the results of the SPARK and reports of child abuse and neglect was larger than expected, although the total explained variance of the model was low. Probably the SPARK measures deregulations of processes of child rearing, augmenting strains in the parent–child relationship, eventually leading to child abuse and/or neglect (Bugental, 2009; Sameroff & Fiese, 2000). Early signs of this deregulation process can be manifold and show in many areas of the functioning of child and/or parents (Hermanns, 2011). The SPARK seems to tap a number of these signs. The approach of looking for risk processes instead of

just listing known risk factors seems to be effective. By this approach the SPARK forms an addition to existing instruments to detect and predict child abuse and neglect.

Knowledge about the validity of the SPARK supports the credibility of risk assessments made by CHC-professionals, and gives insight into the way groups with or without a report differ and finally adds to the knowledge within CHC about risk factors for child abuse and neglect.

Limitations

Despite the high response rate and the finding of strong predictors for reports to ARCAN and YCA, this study has several limitations. Firstly, there is no gold standard or criterion available for assessing the predictive validity of the SPARK. Using reports from ARCAN and YCA is only a partial – though independent and unbiased – assessment of predictive validity, due to the broad scope of the SPARK. We did not expect that all children with an assessment of 'high risk' would be reported and or that all children with a report are only children with an assessment of 'high risk' on the SPARK as: (a) subsequent care will take away part of the problems, (b) the risk assessment is broader than the domain of ARCAN and YCA, and (c) in the 1.5 years after the risk assessment using the SPARK, new events not foreseen at the age of 18 months may happen, resulting in a later report to ARCAN or YCA. Nevertheless the association between the risk assessment with the SPARK and later reports was rather strong.

Secondly, this study depends on comparing registries: ARCAN, YCA and municipal population registries. Children deceased because of abuse would not show up in the municipal population registry and therefore not in this study. An inquiry at ARCAN showed that no such case happened in the study period, with the remark that in such cases, only substantiated CAN-reports were registered, and only when there were other children in the family. This supports the importance of registries (such as child death reviews) as advocated by Palusci, Yager, and Covington (2010).

Thirdly, we may have missed some reports: children who moved out of Zeeland in the period after administration of the SPARK may have been reported to other ARCAN/YCA's. Also, reports may have occurred in the group ($n = 136$) for which we did not receive a SPARK at 18 months.

Fourthly, knowledge of previous services may influence the risk assessment. This was an important reason not to include reports to ARCAN/YCA before the age of 18 months in this study.

Practical implications

The SPARK showed to be a feasible, valid and reliable instrument (Staal et al., 2011; van Stel et al., 2012). The approach of the SPARK of starting a broad dialog with parents about their concerns and care needs, results in a joint decision about any further care. The information obtained by the SPARK will be useful in smoothly transferring children from preventive child health care (CHC) to ARCAN, YCA or medical care. Further research is needed into optimal procedures of transferrals and effectiveness of further care after early detection of parenting and developmental problems.

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