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Early detection of parenting and developmental problems in young children: a structured dialogue with parents

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a structured dialogue with parents

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Ingrid I E Staal, 2016

Early detection of parenting and developmental problems in young children: a structured dialogue with parents

Vroegsignalering van opvoed- en opgroei problemen bij jonge kinderen:
een gestructureerde dialoog met ouders
(met een samenvatting in het Nederlands)

Proefschrift

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geboren op 12 april 1966
te Oostburg

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Chapter 1

Introduction

Overview

The early detection of parenting, health, psychosocial and developmental problems is of major importance: of all children under the age of four, between 10% and 25% encounter varying degrees of problems with respect to parenting or psychological, somatic and social development (1-4). If an intervention is needed, different models have shown us that the sooner it takes place, the more effective it will be (5, 6). This means that early intervention is paramount: it should be based on accurate detection, and it should suit the nature and extent of the problem identified (7-9). To this end, preventive child and youth health care services (CHC) have been made widely available. In the Netherlands, contact with these services is considered standard practice for young families — families are automatically registered and the services are highly accessible. Consequently, CHC provides an excellent environment for the early detection of parenting problems and problems in the development of young children (10-13).

In most countries, the early detection of problems with parenting and/or psychological, somatic and social development is an important part of CHC (1, 14-18). In the Netherlands, early problem detection and the assessment of care needs demonstrated by families are part of the statutory obligations of the Dutch CHC (19, 20). CHC centres in the Netherlands invite parents to bring their child for regular check-ups from birth up to adolescence. This is done according to a predetermined schedule, for example 10–15 times during the first four years of a child's life. During these check-ups, a child's development and growth are monitored, parents are invited to ask questions, and the CHC professionals concerned give preventive advice. Via CHC, up to 98% of all children in the Netherlands receive check-ups in their first year, and 90% of all children aged 1–4 years are reached (21). This means that preventive CHC is highly suited to arrange fixed, scheduled assessments of any parenting and developmental problems.

Despite the availability of a guideline on the early detection of psychosocial problems in young children (22), much remains unclear about the way to carry out the early detection of parenting and developmental problems, and how to assess care needs of families. In today's changing context, new guidance and information is needed with respect to the question which instruments to use, at what age, and at what location. These topics are explored in this introduction, resulting in the formulation of the research questions addressed in this thesis.

Changing context

Recent and current changes in care paradigms are posing new challenges for CHC. CHC professionals are expected: 1. to strengthen parental capacity, 2. to pay attention to normalization based on their knowledge of normal development, 3. to educate parents and offer short-term support so that they are able to care for their families without any need for further specialized care, and finally 4. to improve identification, referral, and engagement with parents (14).

Early signs of a dysfunctional process can be manifold and may appear in many areas of a child's functioning or the functioning of its parents (23). In the context of the many new societal and budgetary challenges that CHC is facing, an approach focused on the identification of risk processes (including the dynamic balance between protective and risk factors) may be more relevant than merely listing static risk factors and symptoms (24, 25). The report on this topic compiled by the Dutch Invent Group (16) suggests ways to improve detection and to address parenting and developmental problems through earlier, faster and more evidence-based assessments, resulting in a shift of focus towards efficacy of detection. At the same time, we see that parents' resistance towards the standardized screening of parenting problems, for instance via self-report questionnaires, is growing (at least in the Netherlands). CHC centres run the risk of being seen by parents as a child abuse detection agency rather than an accessible facility that supports parents of young children (26, 27). This is a serious threat to the Dutch CHC system and its long tradition of broad and comprehensive coverage.

Early problem detection and assessing care needs: choosing the right location

Currently, most activities involved in preventive CHC in the Netherlands — including early detection and needs assessment — are performed at the well-baby clinic. Historically, home visits have played an important role in preventive CHC. In fact, these visits were the main activity during the establishment of home nursing services in the last quarter of the nineteenth century. After the foundation of well-baby clinics for infants and toddlers at the beginning of the twentieth century, the home visit also remained an important activity and included preventive care. However, in their literature review, Burgmeijer and Rijcken (28) concluded that after almost a century of home visits by the CHC, it still remained impossible to specify the exact nature of home visits and to answer the question "whether a home visit is ritual or rational". In 2001, the Dutch government initiated and financed a short-term plan to improve early detection within the context of CHC, whereby CHC organizations were made responsible for determining focus and implementation (29). To illustrate: in Zeeland, a province of the Netherlands, it was decided to carry out and evaluate home visits for children aged 18 months. However, the evaluation (30) of these visits in Zeeland still failed to provide a satisfactory answer to Burgmeijer and Rijcken's question. Nevertheless, this evaluation did give sufficient grounds for setting up scientific research into the added value of home visits compared to visits to the well-baby clinic concerning the early detection of parenting and developmental problems in toddlers. Scientific literature on home visits has shown that systematic reviews and meta-analyses of the effectiveness of home visits focus mostly on treatment programmes for disadvantaged families (31, 32), with a special focus on the prevention of child maltreatment (33, 34) or on children's health and developmental outcomes (35). Despite attention for the home environment paid during these home visit programmes, selection did not include any assessment of home environment and context.

During the development of a protocol for a study on the value of home visits for the early detection of problems with parenting and/or with psychological, somatic and social development in young children, it became evident that no suitable instrument was available for use by CHC professionals to screen for parenting and/or developmental problems. Therefore, the focus of this research shifted to the development of a valid and reliable instrument which could then be used for the early detection of parenting and/or developmental problems in a trial of home visits versus visits to the well-baby clinic.

Early problem detection and assessing care needs: choosing the right instrument

CHC professionals are expected to assess care needs of parents, clarify problems experienced by parents, explain to parents what is considered to be normal development, and make a risk assessment for parenting and developmental problems, usually with the options “at risk” and “not at risk”. As stated above, no guidelines are given as to how to carry out the early detection of parenting and developmental problems or how to assess care needs and risks. However, several requirements can be formulated for instruments that may assist the CHC professional in carrying out these tasks.

According to the literature, structuring information gathering as well as decision making leads to better results. Recently, Bosker, Witteman, and Hermanns (36) and de Kwaadsteniet, Bartelink, Witteman, ten Berge, and van Yperen (37) confirmed the long-standing conviction in the domains of psychology and mental health that structuring risk assessments and decision-making processes improves agreement among professionals when it comes to determining risks, needs, and decisions. The Dutch guideline on the detection of psychosocial problems in children (22) advocates the use of validated instruments, because this improves the detection of children with existing psychosocial problems (38, 39). At the same time, several authors suggest that an assessment of parents’ concerns and their need for support should take place in dialogue with the parents (10, 40, 41), not exclusively through observation by professionals or through self-report by parents.

In order to be useful in the daily practice of current preventive CHC, an instrument for assessing parenting and/or psychological, somatic and social development problems should include the following: 1. a broad scope that includes the child, its family and the child-rearing environment, 2. a systematic approach towards querying concerns and care needs, 3. interaction between parent(s) and professional(s), 4. information about the true nature of the problems experienced, and 5. agreement between parent and professional about the aim and content of any subsequent care. Finally, such an instrument should be valid, reliable, and feasible in daily practice. These elements were included as necessary features of an instrument to be used in an iterative process with close alignment between research and practice.

Currently, several instruments are available for certain aspects of early problem detection, including parent-reported questionnaires (2, 42-44), checklists filled out by CHC nurses (45, 46) and instruments that take into account the concerns of parents (40, 41). However,

no single instrument meets all of the criteria listed above. Therefore, we addressed the need to develop and test an instrument for the early detection and assessment of (early signs of) manifest parenting and/or child developmental problems incorporating the perspectives and experiences of parents as well as CHC professionals.

Early detection of problems at the age of 18 months

The decision to focus on the age of 18 months, and not simultaneously on different ages, is partly based on practical reasons. The research and development of the instrument should be feasible not only within daily CHC practice, but also for the research team. The decision to focus on the age of 18 months was also made on substantive grounds: it is the age when CHC has the widest reach. To illustrate: some children do not attend a playgroup or nursery, or only attend these to a limited extent - approximately 40% of the children aged 0-2 years never attend a nursery or have a nanny (47), and 15-20% of the toddlers (2-4 years) do not visit a playgroup or nursery (47, 48). This means that the CHC centre is the only organization that has contact with (almost) all children and their families. Another reason why the age of 18 months was selected is that children in this age group are in a transitional phase in which they grow from baby to toddler. The early detection of problems at this age should focus on early signs of attachment, behavioural and developmental problems, existing parenting, health, psychosocial and developmental problems, and finally the lack of capabilities and skills needed for the subsequent toddler phase (16, 49, 50).

If it were possible during such a transitional phase to arrange, in dialogue with the parents, a moment to close a given time period, to mark the present and to look ahead to the coming period in terms of the development of the child in combination with the necessary associated skills for the parents, this would create an innovative way of working within the CHC arena. In other words, we should adopt a longitudinal view towards a child's life with certain transition moments when, during the various transitions and in dialogue with parents and child, decisions are made about the type and form of care best suited for the following period. This can then be repeated at the next transition moment for as long as this is required. This approach has previously been recommended by van der Giessen (51).

Aims of the study

This study aims to improve the early detection of parenting and/or psychological, somatic and social development problems in toddlers. Following from the above, two general research questions were formulated:

1. What are the content, structure, and psychometric properties of a newly developed instrument for the early detection of parenting and/or developmental problems in toddlers?
2. What is the added value of a home visit and the newly developed instrument compared to a visit to the well-baby clinic for the early detection of parenting and/or developmental problems in toddlers?

To answer these two general research questions, we set up a series of studies: part A to answer the first question and part B for the second question.

Research questions and outline

Part A

Chapter 2: How can we assess care needs and parenting and/or child developmental problems in toddlers?

We first describe the development of a broad-scope structured interview that includes the child, its family and the child-rearing environment, a systematic approach of querying concerns and care needs, interaction between the parent(s) and the CHC professional, information about the true nature of problems experienced, and finally agreement between parent and professional about the aim and content of any subsequent care. The elaboration of this approach, known as the Structured Problem Analysis of Raising Kids (SPARK), is followed by initial results concerning feasibility and discriminative capacity.

Chapter 3: What are SPARK's psychometric properties?

We assessed the SPARK on inter-rater reliability, convergent validity, discriminative validity, and its usability for parents as well as CHC professionals.

Chapter 4: What is the predictive value of the risk assessment included in the SPARK concerning child abuse and neglect?

We tested the hypothesis that increasing risk for parenting and/or developmental problems as assessed by the SPARK is associated with an increased number of substantiated reports of child abuse and neglect.

Part B

Chapter 5: In comparison with a visit to the well-baby clinic, does a home visit improve the early detection of parenting and/or developmental problems in young children?

We performed a randomized controlled trial to assess the difference between home visits and visits to the well-baby clinic in terms of the early detection of parenting and/or developmental problems by using a validated structured interview, and we assessed the usability for parents as well as CHC professionals.

Chapter 6: SPARK versus Care as Usual: can we speak of added value?

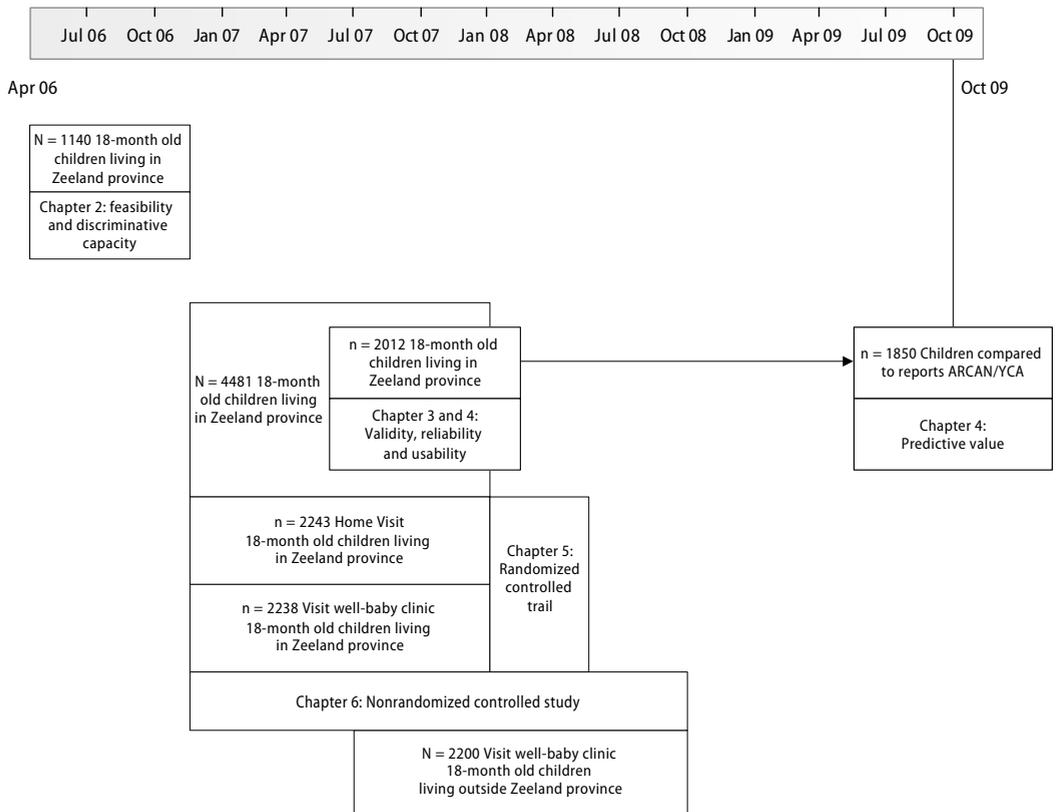
In this non-randomized controlled study, we assessed whether parents' care needs and the detection of parenting and/or developmental problems improve when the SPARK is used at the well-baby clinic, compared to regular visits to the clinic without the use of a structured interview (i.e. care as usual).

Chapter 7 presents an overall discussion of the study's findings and considers further research developments and implications.

Chapter 8 provides a summary of this thesis.

Figure 1 below shows the studies presented in this thesis and includes the different samples and sample sizes in terms of time and their related chapters.

Figure 1. Overview of the studies presented in the thesis.



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The content, structure, and psychometric properties of a newly developed instrument for early detection of parenting and/or developmental problems in toddlers

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PART A

Chapter 2

How can we assess care needs and parenting and/or child developmental problems in toddlers?

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Assessment of parenting and developmental problems in toddlers: development and feasibility of a structured interview

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Abstract

Background Assessment of (early signs of) parenting and developmental problems in young children by preventive child health care (CHC) workers is recommended, but no validated instruments exist. The aim of this project was to develop and test an instrument for early detection and assessment of problems in toddlers, using the perspectives and experience of both the parent and the professional.

Methods Using an iterative process, we adapted and expanded a structured interview on need for parenting support into the Structured Problem Analysis of Raising Kids (SPARK). The SPARK consists of 16 subject areas, ranging from somatic health to family issues. The SPARK was tested in daily practice for feasibility and discriminative capacity. The sample consisted of all toddlers aged 18 months living in Zeeland, a province of the Netherlands, during the study period (n = 1140).

Results The response rate was 97.8%. Although the median level of support needed according to the SPARK was low, 4.5% of the toddlers and their parents required intensive help or immediate action. The risk assessment showed 2.9% high, 16.5% increased and 80.6% low risk for parenting and developmental problems. The risk assessment of the CHC professional was associated with known risk factors for child maltreatment.

Conclusions This study shows that a structured interview, named the SPARK, is feasible in daily practice and clarifies risks and care needs for parenting and developmental problems in toddlers.

Introduction

Prevention and early detection of parenting problems in young children have received considerable attention in recent years. There is agreement in the field that the early detection of parenting problems and problems in the psychosocial development of young children is vital (1-6). Subsequent required interventions are supposed to be more effective when they are carried out earlier (7-11).

The Dutch preventive child health care (CHC) services have a population-based preventive approach that reaches almost all children in the Netherlands during a period of several years (3). Therefore, preventive CHC is highly suited to fixed schedule assessments of parenting and developmental problems.

Children in the age group of approximately 18 months are in the transitional phase from baby to toddler. Early detection of problems at this age should focus on early signs of attachment, behavioural and development problems, on existing parenting, health, psychosocial and developmental problems and on (a lack of) capabilities and skills needed for the subsequent toddler phase (3, 11-13). In our opinion, this risk analysis requires a careful assessment, preferably in dialogue with the parents, as proposed by Glascoe (14) and Puura and colleagues (15).

Initially, an instrument was sought to improve and professionalize risk assessment of parenting and child developmental problems by CHC nurses. However, it was not possible to find a comprehensive and valid instrument that targets such risk assessment for toddlers through dialogue with the parents during home visits. Existing parent-reported questionnaires (16-19), checklists filled out by CHC nurses (20, 21) and instruments that do take into account concerns of parents (14, 15) all missed one or more elements that we considered necessary: a broad scope that includes both the child and its family and environment, a systematic approach of querying concerns and care needs, interaction between the parent(s) and professional, information about the true nature of experienced problems, and agreement between parent and professional about the aim and content of any subsequent care.

The aim of this project was to develop and test an instrument for early detection and assessment of (early signs of) manifest parenting and child developmental problems by using the perspectives and experience of both the parent(s) and the CHC professional. This instrument should fit within the goals of preventive CHC and be useful for the younger age group. We first describe the development of such an instrument, followed by the initial test results with respect to its feasibility and discriminative capacity.

Methods

Instrument

Based on a literature review and suggestions from experts, we adapted and expanded the existing Dutch structured interview 'Vragenlijst Onvervulde Behoeften en Opvoedingsondersteuning' (VOBO, Unfulfilled Needs for Parenting Support) for use in home visits

to parents of young children (22). The VOBO is an instrument that addresses 12 areas (appropriate to the age of the child) of parenting and child development during a structured interview of 20–30 min with the parent or parents. The VOBO has been used in several populations, including Dutch families with both low and high educational backgrounds (22), Moroccan and Turkish immigrants (23) and on the island of Curaçao (24). These empirical studies found significant correlations with parenting stress, supporting the construct validity of the VOBO.

The VOBO needed further development in four areas: (i) the content and order of the subject areas should be suitable for the age group of 18 months; (ii) the current severity of any problems should be assessed by the parent(s) as well as the CHC professional; (iii) the CHC professional should make an overall risk assessment; and (iv) the content of subsequent care is suited to the problems and agreed upon by parent(s) and CHC professional. The VOBO was adapted in close collaboration with an expert group of experienced CHC nurses. Each of the 10 regional CHC teams in Zeeland province contributed one member to the expert group. With an interactive and iterative process of testing and feedback between the researchers and the expert group of CHC nurses, an adapted and expanded version of the VOBO was developed. This adapted and expanded version is called *Structured Problem Analysis of Raising Kids (SPARK)*.

The SPARK consists of 16 subject areas (or topics) in the following order: infancy review; somatic health; motor development; language, speech and thought development; language use of parents (second language, mother tongue); emotional development; contact between child and others (both children and adults); child behaviour; 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 was forgotten or needed further attention.

Two topics need further clarification. The first topic, 'infancy review', has three goals: beginning the interview with an 'easy' topic familiar to both parent(s) and CHC nurse, reviewing past issues and discussing any problems from the infant period that are still relevant (25). 'Family issues' includes a wide range of topics concerning family members: health problems, addiction, psychiatric problems, relational problems, financial problems, divorce, death and additions to the family.

The SPARK uses a three-step model: Step 1: detection of problems and concerns; Step 2: clarifying the characteristics and seriousness of problems and concerns in dialogue with the parents; Step 3: analysis and a decision on what to do next. This type of three-step model has previously been suggested as being suitable for investigating parenting and development problems (3). 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 seriousness of these concerns on a 5-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 – was sufficient. Each topic ends with the parents assessing their current perceived need for support, on a 6-point Likert scale: (1) no help needed; (2) information wanted; (3) personal advice; (4) counselling; (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 in the following months (Step 3).

Intensive help or immediate action mostly leads to a referral to professionals outside preventive CHC, while information wanted/personal advice/counselling are often done by the CHC nurse, if possible during the same home visit as the SPARK exercise. After this, the CHC nurse ends the home visit and subsequently makes an overall risk assessment, assigning the child to low, increased or high risk for parenting and development problems. The CHC nurse bases this overall risk assessment on the information from the interview, and on an elaboration of factors that might influence this risk assessment positively or negatively. This structured elaboration includes the observed interaction between parent(s) and child(ren) and the observation of growth, development, manifest problems and living environment.

Study design

The goal of the next phase was to test the feasibility and discriminative capacity of the SPARK in daily practice with 1000 toddlers. Approval for this study was obtained from the Medical Ethical Review Committee of the University Medical Center Utrecht. Prior to the start of this test phase, all 63 CHC nurses from Zeeland province were trained in using the SPARK. Training was done in three groups of 15–25 nurses. In daily practice, the expert group members functioned as a first-line support for their team members.

The CHC nurse then contacted parents for the regular check-up at the age of 18 months, consisting of a home visit by the CHC nurse, and included an information letter on the goal of the study. The home visit started with the structured interview (SPARK), with the primary goal of deciding together with the parent(s) which type of (health) care was needed by child and parent(s). The interview was followed by a request (verbal + written) for informed consent to use the information recorded in the SPARK for scientific research. This order was chosen on purpose, as it may be very difficult to talk about parenting problems and care needed after informed consent has been denied.

The SPARK was tested in daily practice by all 63 CHC nurses of the three preventive CHC organizations in Zeeland. In the period from April to November 2006, 1140 eligible children aged 18 months were included.

Data analysis

To assess the association between the different questions in the SPARK, we computed Spearman correlations between concerns, perceived need for support, risk assessment by the professional, and known demographic risk factors for child maltreatment. Summary scores for concerns and perceived need for support were computed by summing the scores for all subject areas and dividing by the number of areas. For each subject area, we assessed the differences between parents and professionals on the 6-point scale for perceived need of support, using the Wilcoxon signed ranks test. We calculated a 'known risk factor' summary score by summing the presence of the following risk factors (26, 27): large family (>four 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.

Furthermore, we assessed discriminative validity by testing differences in parent and family characteristics between the groups with low, increased and high risk. These between-group differences were assessed with an ANOVA or Kruskal–Wallis, depending on the variable. All analyses were done using spss 15. Differences and correlations were considered to be statistically significant if $P < 0.05$.

Results

Response was high, with only 0.3% no contact and 1.9% no consent. Data concerning 1115 children were used in the analyses. In 99.6% of the cases, the SPARK was filled in during a home visit, while 0.4% of the children and their parent(s) were interviewed during a visit to the CHC centre. The mother was most often present during the interview (98.5%); fathers were less often present (19.6%). During 19.1% of the SPARK interviews, both parents were present. In 4.8% of interviews, someone else was present (another family member or guardian). Other children from the same family were present in about a quarter of the interviews (25.3%). The mean duration of the home visit was 66 min [standard deviation (SD) = 20 min], while completing the SPARK took on average 37 min (SD = 13 min). The first step of the SPARK is to ask the parents if they have experienced any concerns or problems and whether there were unfulfilled needs. The median summary score of the topics on experienced concerns by the parents was 1.6 [interquartile range (IQR) = 1.3–1.9; see Fig. 1]. Almost all parents had questions concerning child raising or the development of their child. Topics most mentioned were the 'infancy review' and 'family issues' (see Table 1; first column). In general, mothers perceived the concerns or problems as more severe than fathers, with the exception of 'family issues'. Fathers reported more unfulfilled needs when discussing the topics 'living environment' and 'how the child spends his/her time'. Mothers mentioned most unfulfilled needs regarding the topics 'family issues', 'emotional development', 'child behaviour' and 'parenting approach'. The two-parent list showed stronger concerns with regard to 'infancy review', 'social contacts', 'concerns communicated by others' and 'family issues'. Furthermore, when both parents were present,

more serious concerns were recorded in response to the last point, 'whether any topic was forgotten or needed further attention'.

The second step of administering the SPARK consists of asking both the parents and the professional for the current perceived need for support. The median summary score of the parents was 1.1 (IQR = 1.0–1.3) and of the professionals 1.3 (IQR = 1.1–1.5; see Fig. 2). Parent(s) and CHC professional mostly agreed on which topics needed further support, but generally professionals indicated a higher level of support needed (see Table 1; for most domains $P < 0.001$). This occurred most frequently on topics such as 'child behaviour', 'parenting approach', 'emotional development', 'language, speech and thought development', where the professional is able to initiate interventions by him/herself. Differences between the assessments of parent and professional were most frequent in the categories 'information wanted', 'personal advice' and 'counselling', and not in the more serious categories 'intensive help' and 'immediate intervention required' (see Table 1; column 2–5). This is exemplified by the finding that there are no significant differences between assessments from parents and professionals in the group labelled as 'high risk'.

Intensive help or immediate action as reported by the professionals was needed by 4.5% of the children and their parents on one or more areas, while 38.7% of the children and their parents wanted personal advice or counselling on one or more areas. Topics with the highest levels of support needed were 'family issues', 'living environment', 'motor development', 'day care for the child' and the final question regarding whether anything had been forgotten or needed further attention. In response to this last question, topics mentioned included problems experienced by the parents and vaccinations, the behaviour of other children (often the eldest child), child protective services/guardian, school choice for older child, combination of an adolescent and a toddler living in the same house, and unemployment. Interestingly, parents from the high-risk group did not report concerns on all areas, in contrast with the low and increased-risk group parents. This lack of concern contrasted with the intensity of care required: the percentage of 'intensive help' and 'immediate intervention' was 1.5 to 15 times higher in the high-risk group than in the increased-risk group.

The third step of the SPARK concerns an analysis and a decision on what to do next. Most of the follow-up actions can be done by the CHC professionals themselves within their regular contacts (83.1%), while for 16.6% of the children, additional contacts are required, and 0.3% of the children need fewer contacts than the regular set of appointments (13). Finally, the professional assigns an overall risk assessment after having analysed which factors influence this risk estimation positively or negatively. The risk assessment showed 2.9% high, 16.5% increased and 80.6% low risk. The mean sum of risk factors was low: 0.41 (SD = 0.9).

The association between the different questions was examined by correlation coefficients (Table 2) and by box plots (Figs 1 & 2). The correlation coefficients between concerns, perceived need of support and risk assessment are moderate, and varied between 0.33

and 0.41. The correlation coefficients between the SPARK questions and the sum of known risk factors for child maltreatment are low, with exception of the moderate correlation of the sum of known risk factors with the risk assessment ($r = 0.29$). Figure 1 shows graphically that a higher risk assessment is associated with an increase in summary score of concerns reported by parents, and Fig. 2 an increase in summary score of perceived need of support by parents and professional.

In Table 3, population characteristics, broken down to clarify risk factors, were presented per risk assessment group. There were no significant differences in child characteristics between the different risk assessment groups. However, family and parent characteristics did show significant differences between risk assessment groups. Increased risk and high risk were associated with family composition, age of mother at birth, non-Dutch ethnicity, language spoken (non-Dutch), low education for both parents and mother's employment status (all $P < 0.01$).

Figure 1. Boxplot of parents' concerns.

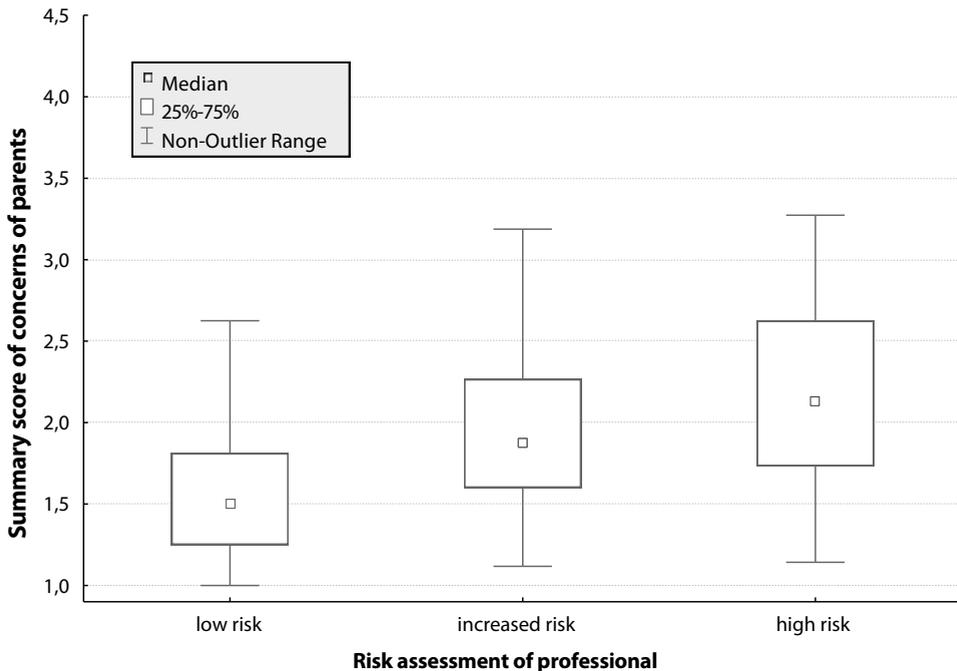


Table 1. Concerns experienced by parents, assessment of level of support needed by parents and professional, per area (one-parent list).

Domains: (percentages)	Parent concerns	Perceived need of support			<i>p</i> -value*	
		Parents assessment*		Professional assessment*		
	concerned/ very concerned	information wanted/ personal advice/ counseling	intensive help/ immediate intervention required	information wanted/ personal advice/ counseling	intensive help/ immediate intervention required	parents vs professional
Infancy review	17.3	9.3	1.5	11.1	1.0	0.2
Health and development						
Somatic health	8.4	17.3	1.0	23.6	1.0	<0.001
Motor development	1.7	14.5	1.0	23.4	0.8	<0.001
Language, speech and thought development	0.9	21.9	-	39.4	0.1	0.03
Language use of parents	2.2	10.5	0.3	23.7	0.3	<0.001
Emotional development	4.8	25.8	0.7	43.7	0.6	<0.001
Child-parent interaction						
Contact between child and others	1.8	10.6	0.2	20.8	0.1	<0.001
Child behaviour	6.1	34.9	0.8	53.0	1.3	<0.001
Parenting approach	5.1	32.7	1.0	47.3	1.0	<0.001
Developmental stimulation	0.5	15.6	-	28.5	-	<0.001
Time spending	1.8	16.3	0.1	16.3	0.1	<0.001
Family and environment						
Living environment	4.7	3.9	0.7	8.8	0.9	<0.001
Social contacts	2.2	5.2	0.6	8.9	0.6	0.001
Day care for child	2.3	5.7	0.2	9.3	0.1	<0.001
Concerns communi- cated by others	2.5	4.9	0.2	6.7	0.5	<0.001
Family issues	11.4	9.8	2.1	14.4	2.6	<0.001
Was any topic forgotten?	4.4	12.2	1.0	13.6	1.5	0.1

*The 6-point assessments of parents and professional were dichotomized for readability; category 'no help needed' was omitted. The comparison using Wilcoxon signed ranks test was on the full 6-point scale.

Figure 2. Boxplot of perceived need of support.

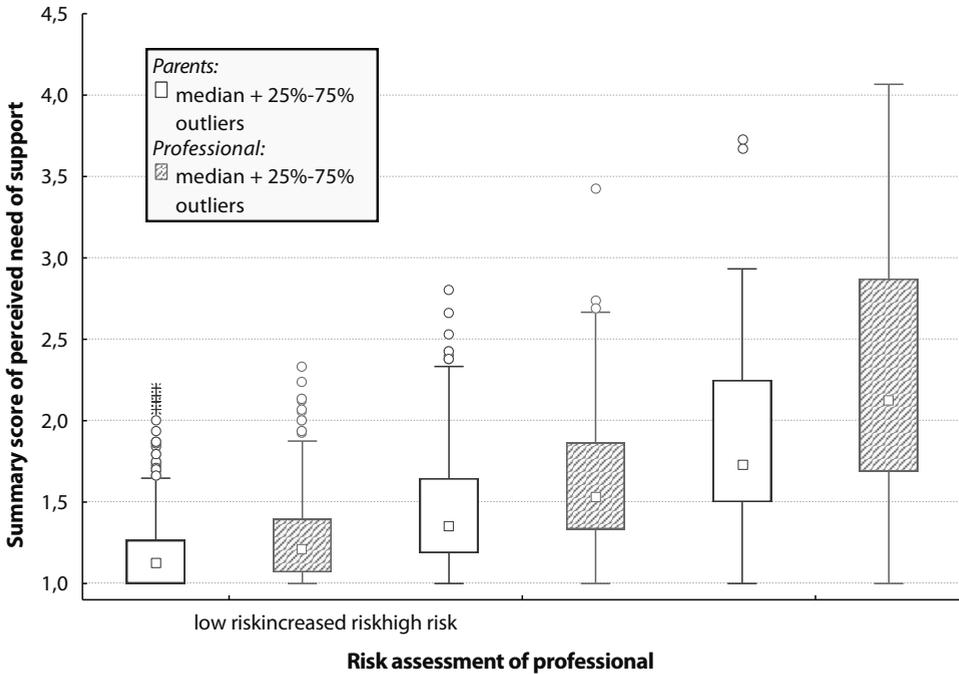


Table 2. Correlations between assessments and risk factors.

Assessments	Parent assessment of perceived need of support	Professional of perceived need of support	Risk assessment professional	Sum of risk factors*
Parent concerns	0.43**	0.41**	0.33**	0.11**
Parent assessment of perceived need of support		0.73**	0.38**	0.14**
Professional assessment of perceived need of support			0.41**	0.20**
Overall risk assessment professional				0.29**

*Risk factors: 4 or more children, one-parent household, parents younger than 20 years, very low education level of the parents, parents not speaking Dutch at home, parents are unemployed/unemployable.

**Correlation is significant at the 0.01 level (two-tailed).

Table 3. Population characteristics per risk group.

Child characteristics (percentages)	Low-risk group	Increased-risk group	High-risk group	<i>p</i> -value*
Male/female	54.4 / 45.6	55.4 / 44.6	51.5 / 48.5	0.8
Place in family order				0.1
First child	44.0	37.1	32.3	
Second child	36.2	39.2	32.3	
Third child	13.3	14.5	25.8	
Fourth or younger child	6.5	9.1	9.7	
	(max 10 children)	(max 7 children)	(max 6 children)	
Family characteristics (percentages)				< 0.001
Two-parent household	96.3	78.9	66.7	
One-parent household	1.4	11.7	16.7	
Shared household	1.5	4.4	6.7	
Other (foster family/adoption/divorcement/living with grandparents)	0.9	5.0	10.0	
Parent characteristics (percentages)				
Age mother (mean in year, SD)	30 (SD 4.7)	29 (SD 5.2)	28 (SD 5.3)	< 0.001
Mother age < 20 yr at birth of this toddler	0.8 (n = 7)	4.9 (n = 9)	9.7 (n = 2)	< 0.001
Age father (mean in year, SD)	33 (SD 5.2)	33 (SD 6.6)	31 (SD 5.7)	0.21
Father age < 20 yr at birth of this toddler	0.2 (n = 2)	1.7 (n = 3)	-	0.02
Ethnicity: non-Dutch mother	7.0	20.4	9.1	< 0.001
Ethnicity: non-Dutch father	6.1	18.3	12.1	< 0.001
Language: non-Dutch used at home by mother	6.3	20.4	9.1	< 0.001
Language: non-Dutch used at home by father	5.5	14.0	6.1	< 0.01
Education				<0.001 mother <0.001 father
Low education	19.0 mother (including 2.2 very low) 23.3 father (including 1.8 very low)	36.9 mother (including 11.2 very low) 43.1 father (including 9.0 very low)	50.0 mother (including 26.7 very low) 57.1 father (including 10.7 very low)	
Intermediate education	53.8 mother 47.9 father	43.0 mother 35.9 father	36.7 mother 21.5 father	
High education	27.2 mother 28.8 father	20.1 mother 21.0 father	13.3 mother 21.4 father	
Employment				<0.001 mother 0.8 father
Employed	71.9 mother 93.4 father	43.0 mother 77.4 father	48.5 mother 60.6 father	
Unemployed	0.8 mother 0.4 father	5.4 mother 3.2 father	6.1 mother 12.1 father	
Unemployable/unable to work	0.1 mother 0.1 father	2.7 mother 3.8 father	6.1 mother 3.0 father	
Stay-at-home mother/father	21.3 mother 0.2 father	33.9 mother 1.1 father	33.3 mother -	

*Using Kruskal-Wallis test, with exception of age and family order: using ANOVA.

Discussion

Using an iterative process and in close cooperation between research and practice, we adapted an existing structured interview on the need for parenting support and expanded it into an instrument for early detection and assessment of parenting and developmental problems in young children. This new instrument combines the perspectives of the parent(s) and the professional and fits within the goals of preventive CHC.

The SPARK was feasible to use as a population-based preventive approach in children aged 18 months. The majority of the children were labelled by the CHC nurse as having low risk for parenting and developmental problems. About 16% of the children were identified as having increased risk, while almost 3% were assessed as being at high risk for parenting and developmental problems. Almost half of the population needed some help, ranging from personal advice to immediate action. About 5% of the children and their parents needed help or immediate action on one or more topics, mostly requiring a referral to professionals outside the preventive CHC. Almost all parents had questions concerning child raising or the development of their child, and needed support at some point in their parenting career (2, 28). This study shows that these questions, if discussed appropriately, can be detected by the CHC professional. The SPARK provides relevant information about problems experienced and care needs, which can immediately be put to use. Both agreement and disagreement between scores of parents and professional are useful for deciding which follow-up actions to take. This type of information can also be useful for personal reflection and for coaching, monitoring and reliability checks. In our opinion, the SPARK helps CHC nurses to acquire a more professional attitude towards early detection of parenting problems.

The risk assessment of the CHC professional was associated with known risk factors for child maltreatment. Children from families with a single-parent household, non-western families, low education level, unemployed mother and younger aged mother were, according to the SPARK, at increased risk for parenting and developmental problems.

Other studies showed that among children aged 14 months to 4 years of age, about 7.6–9.4% of the children were identified by the preventive CHC professional as having psychosocial problems (29, 30). Dossier analysis of families with at least one child aged 0–3 years found that 18% of the families had a risky problem situation regarding one or more domains: the child, the parents, or the interaction between parent and child and the environment (31). All these studies emphasized the need to improve both the identification of problems and follow-up actions by the preventive CHC professionals. Zeijl and colleagues (32) studied the age group 0–12 and reported that most children in the Netherlands are doing well. At the most, 5% had to deal with multiple problems. However, the group with one severe problem was bigger and varied between 6% and 15%. The percentage of children with problems, as identified by the SPARK, is in accordance with these findings from the literature.

Child health care in the Netherlands has a population-based preventive approach, reaching about 98% of all children in the first years of life (33). This strength of preventive CHC

resulted in a very high response rate. The response is similar to other CHC studies in the Netherlands, which have shown response rates of 92% to 95% (29, 30).

This study has a number of limitations. First, completing the SPARK takes more time (on average 37 min) than is usually available during a regular appointment at the well-baby clinic (15 to 20 min). Further research should clarify whether this extra time results in improved outcomes. Second, the association of concerns and perceived need of support with known risk factors for child maltreatment was weak. This was expected, as the SPARK was meant for use in the general population and has a broad scope, and is not intended to measure risk for child maltreatment. On the other hand, parenting problems may lead to child maltreatment, so the significant association between the overall risk assessment and known risk factors was expected.

Third, the validity of the SPARK was only partially assessed. Content validity was obtained in the current study by developing the SPARK in close cooperation with an expert group of experienced CHC nurses. Furthermore, the SPARK was based on an existing questionnaire, the VOBO. The findings in this study about which problems and concerns parents perceive as most significant are consistent with the results obtained by the VOBO (22-24). The next step in research on the SPARK would be to assess reliability, validity and diagnostic accuracy. Further results will contribute to the discussion as to whether broad, careful assessment in dialogue with the parents is worthwhile and feasible.

Conclusions

This study shows that the SPARK is a feasible instrument with a discriminative capacity for the early detection of parenting and developmental problems in toddlers. The SPARK has a broad but structured scope and combines the perspectives of parent and professional. We recommend further study of the validity and reliability of the instrument and evidence for the risk assessment.

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Chapter 3

What are SPARK's psychometric properties?

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Validity and reliability of a structured interview for early detection and risk assessment of parenting and developmental problems in young children: a cross-sectional study

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Abstract

Background Preventive child health care is well suited for the early detection of parenting and developmental problems. However, as far as the younger age group is concerned, there are no validated early detection instruments which cover both the child and its environment. Therefore, we have developed a broad-scope structured interview which assesses parents' concerns and their need for support, using both the parental perspective and the experience of the child health care nurse: the Structured Problem Analysis of Raising Kids (SPARK). This study reports the psychometric characteristics of the SPARK.

Method A cross-sectional study of 2012 18-month-old children, living in Zeeland, a province of the Netherlands. Inter-rater reliability was assessed in 67 children. Convergent validity was assessed by comparing SPARK-domains with domains in self-report questionnaires on child development and parenting stress. Discriminative validity was assessed by comparing different outcomes of the SPARK between groups with different levels of socio-economic status and by performing an extreme-groups comparison. The user experience of both parents and nurses was assessed with the aid of an online survey.

Results The response rate was 92.1% for the SPARK. Self-report questionnaires were returned in the case of 66.9% of the remaining 1721 children. There was selective non-reporting: 33.1% of the questionnaires were not returned, covering 65.2% of the children with a high-risk label according to the SPARK ($p < 0.001$). Inter-rater reliability 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. Convergent validity was unexpectedly low (all correlations ≤ 0.3) although the pattern was as expected. Discriminative validity was good. Users were satisfied with the SPARK and identified some topics for improvement.

Conclusion The SPARK discriminates between children with a high, increased and low risk of parenting and developmental problems. It does so in a reliable way, but more research is needed on aspects of validity and in other populations.

Background

Early detection of parenting problems and problems in the psychosocial development of young children is important (1-7), as interventions are supposedly more effective when they are carried out earlier (6-12). Evidence shows that this early detection is preferably done by using a validated instrument (7,13,14).

In the Netherlands, the law requires preventive child health care (CHC) to detect parenting and developmental problems at an early stage. However, as the younger age group is concerned, there are no validated early detection instruments which cover both the child and its environment. Therefore, we have developed the Structured Problem Analysis of Raising Kids (SPARK)(15). The SPARK is a structured interview for early detection and risk assessment of parenting and developmental problems in young children. This instrument combines the perspectives of the parent(s) and the professional. The SPARK asks parents to voice any concerns and problems on a broad range of topics, and then to indicate the need for support perceived by both parent and CHC professional, followed by a joint decision on subsequent care. It finishes with a structured overall risk assessment for parenting and developmental problems by the professional.

The development study of 1140 children shows that the SPARK is discriminative and practicable (15). Before the SPARK can be further implemented in clinical practice, further study is needed on the psychometric characteristics of this instrument. As no criterion instrument ('gold standard') exists for early detection of parenting and developmental problems, criterion validity cannot be assessed. Therefore, we have assessed the SPARK on interrater reliability, convergent validity, discriminative validity, and the user experience of both parents and CHC professionals.

Methods

Study design

We performed a cross-sectional study on all children living in the province of Zeeland and born between January 15 and July 31 2006, a total of 2012 children. Once a month, all children who would reach the age of 18 months the following month were identified in the municipal population registry. This has the goal that all eligible children could be contacted. The CHC nurse contacted parents for the regular check-up at the age of 18 months, which consisted of a home visit by the CHC nurse or a visit to the well-baby clinic by parent(s) and child, and included an information letter on the aim of the visit and the primary study (assessing the value of a structured interview during home visits and visits to the well-baby clinic). The visit started with the structured interview (SPARK), with the primary goal of deciding together with the parent(s) which type of (health) care was needed by child and parent(s). The interview was followed by a request (verbal + written) for informed consent to use the information recorded in the SPARK for scientific research. The order of the steps was chosen on purpose, as it would be complicated to discuss parenting problems and care needed after informed consent was denied. The CHC nurses were not aware of the

study goals of the validation study to prevent bias. The study protocol was approved by the Medical Ethical Review Committee of the University Medical Center Utrecht. Reliability of the SPARK was assessed by the interrater agreement. In a random sample of 67 children a second CHC nurse was also present. Her function was to listen to the interview, without interfering, and to fill in the SPARK-form independently from the interviewing CHC nurse. Convergent validity was assessed by comparing SPARK-domains with domains in self-report questionnaires on child development and parenting stress which cover concepts also addressed in the SPARK. Parents who gave informed consent were requested to complete a set of questionnaires (described below). Discriminative validity was assessed by comparing different outcomes of the SPARK between groups with different levels of socio-economic status (SES) and by performing an extreme-groups comparison. We hypothesized that children from families with lower SES would report more problems and need for support, and that this group would include more children with a high and increased risk of parenting problems. The extremegroups comparison was done by comparing the mean levels of concern and perceived need for support and the risk assessment between a) all children with a confirmed report to the child protective services between birth and the age of 18 months ($n = 21$), and b) the 'everything OK' group: a group of children with normal scores on all self-report questionnaires and no known risk factors (which include large family (\geq four 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) (16,17). As the latter group was very large ($n = 912$), we took a random sample from this group of three times the number of the reported group. Again, children with a confirmed report were expected to show more problems and a higher risk.

Instruments

The way the SPARK was conceived has been described in detail in a previous study (15). The SPARK consists of 16 topics in the following order: infancy review (reviewing past issues and discussing any problems arising from the infant period that are still relevant); somatic health; motor development; language, speech and thought 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/preschool education; how the child spends its 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 seriousness of problems and concerns in dialogue with the parents; 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 six months (Step 1). Parents are requested to assess the seriousness 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) counselling; 5) intensive help; 6) immediate intervention required. The CHC professional then makes the same assessment (Step 2). The information of steps 1–2 is recorded on a one-page form with a matrix structure: the first column includes all topics, followed by columns for each separate question: concerns / used support / support helped / current perceived need for support by parents / perceived need for support by nurse. After all the topics have been covered, the CHC nurse discusses with the parents the amount and content of care needed in the following months (Step 3), and notes this together with a description of the concern or problem on the second page, on which the possibilities for further care have been preprinted. Having done this, the CHC nurse ends the visit and subsequently makes an overall risk assessment on the third page, assigning the child a low, increased or high risk for parenting and 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 this risk assessment. This structured elaboration includes the observation of several factors, preprinted on the third page: the interaction between parent(s) and child(ren); growth and development of the child; manifest problems (both in the child such as existing illness, and in the family such as major life events, history of psychiatric illness, financial problems etc.); and living environment (hygiene, housing, family composition).

The set of self-report questionnaires on child development and parenting stress included a pre-stamped envelope addressed to the research team. The set consisted of the following questionnaires: 1) Ages and Stages Questionnaire (ASQ) version 2, 18-month version (18,19). The ASQ consists of 30 questions on 5 domains: communication, gross motor, fine motor, problem solving and personal social. The ASQ has three answering options: 'yes', 'sometimes', 'not yet'. Domains have a range of 0 to 60. 2) The Ages and Stages Questionnaire: Social Emotional (ASQ:SE, 18 month version) also has three answering options: 'most of the time', 'sometimes' and 'rarely or never'. Parents are asked to tick off a checkbox if the item in question is a concern (20). The ASQ:SE has a scoring range of 0 to 255 in the 18-month version. 3) the short validated Dutch version of the Parenting Stress Index (21), called 'Nijmeegse ouderlijke stress index – kort' (NOSIK) (22). The NOSIK consists of 25 items using a 6-point Likert scale ranging from 'do not agree at all' to 'do completely agree', with a scoring range of 25 to 150. 4) a partly validated questionnaire on psychological and pedagogic problems in young children which is frequently used in preventive CHC in the Netherlands: the 'Kort Instrument voor de Psychologische en Pedagogische

Probleem Inventarisatie' (KIPPI) (23). This self-report questionnaire consists of 70 items grouped into a total score, and 19 yes/no items on life events.

The 18-month versions of both ASQ and ASQ:SE have been translated into the Dutch language using a double forward – once backward procedure. The (minor) differences have been resolved in cooperation with the developer of these questionnaires. Although these translations of the ASQ and ASQ:SE have not been validated, the ASQ and ASQ:SE have proven to be practicable and valid in other countries than the USA [24-26], including the Netherlands (48 month version (27)). Additionally, data have been gathered on demographic variables: age of father and mother at birth of first child, level of education of both parents, current working status of both parents, language spoken at home. Both the SPARK and the self-report questionnaires have been scanned using Teleform®. Socio-economic status (SES) has been assessed on neighborhood level: using the postal code for the house address of the child, each child has been assigned the SES-level of his or her neighborhood, using figures of Statistics Netherlands delivered by the Municipal Health Service of Zeeland. SES has been measured in 7 categories, from very low to very high. Most of the 155 postal code regions in Zeeland have a medium SES. For the extreme-groups comparison, we checked with the child protective services (Advice and Reporting Centres for Child Abuse and Neglect, and Youth Care Agency) which children in our sample had a confirmed report between birth and the age of 18 months.

For assessment of the user experience of both parents and CHC professionals, we adapted a short questionnaire on CHC nurses' skills meant for increasing parents' parenting competences (28). During November 2007, parents and CHC nurses were asked to complete this questionnaire online for each visit using the password-protected online survey tool NetQ (<http://netq.nl>).

Statistical analysis

Reliability of the SPARK was assessed by the inter-rater agreement between the SPARK and a listen-only version as described above. We computed an intraclass correlation (ICC) using an 'observer nested within subject' approach (29). We only did this for the risk assessment and the need for support on the different topics as perceived by the CHC professional, as the answers given by the parents would be scored identically. Convergent validity of the SPARK was assessed by computing Spearman correlations between the care need expressed by parents and by CHC professionals on the 16 topics with domains in the self-report questionnaires. Using a multitrait-multimethod matrix (30) we expected higher correlations between related domains, such as motor development in the SPARK and gross motor in the ASQ; child behavior with ASQ:SE total score and NOSIK etc; and low correlations between differing domains such as physically oriented domains in the SPARK and parenting stress (the NOSIK score). Solely for the purpose of assessing discriminative validity, we computed summary scores for concerns and perceived need for support by summing the scores for all topics and dividing by the number of topics. Thus,

the scoring range of the summary scores was the same as with the original variables. Differences between postal code regions with different SES-levels on these summary scores for concerns or perceived need for support were tested using a Kruskal-Wallis test (31). The extreme groups were compared using a Mann-Whitney U-test on concerns and perceived need for support, and a chi-square test on the risk assessment. Data-analysis was done using SPSS version 17. A p -value below 0.05 was considered significant.

Results

During the study period 2012 eligible children were living in the province of Zeeland. No SPARK was received for 136 children (6.8%). For another 155 children, an incomplete SPARK was available. This group consisted of a) received with comment 'no contact wanted by parents' ($n = 24$); b) missing risk and/or consent data ($n = 25$); and c) no consent obtained after administration of the SPARK ($n = 106$). Children for whom no SPARK was received, or an almost empty SPARK with the comment 'no contact wanted by parents', were counted as a non-response. From the remaining 1721 children, selfreport questionnaires were returned for 1152 children (66.9%). Characteristics of the study population are described in Table 1. Administration of the SPARK took on average 29 minutes (standard deviation 11 min.). Table 2 shows scores per domain on parents' concerns, needs assessment by parents and professional.

Reliability

Concerning inter-rater reliability, ICCs were very high for physical topics (>0.85 to 1.0; see Table 3). For socialemotional topics, ICCs varied between 0.61 and 0.8. The ICC of the overall risk assessment was also very high: 0.92.

Validity

Convergent validity was low, with no correlations exceeding 0.3. Despite the low correlations, the pattern was as expected: higher scores (in this case above 0.1) were only found in domains that were expected to have higher correlations. Correlations above 0.2 include SPARK motor development with ASQ gross motor; SPARK language-, speech- and cognitive development with ASQ communication; SPARK child behavior with KIPPPPI total score; SPARK family issues with KIPPPPI life events (see Table 4). Domains of the NOSIK were not related to physically oriented SPARK domains, and significantly correlated to psychosocial domains. All correlations above 0.1 were significant at the 0.01 level.

Analysis of groups based on SES-level showed that there was a highly significant difference in overall risk assessment ($p < 0.001$): there were relatively more children labeled as high risk in the lower SES groups compared to the groups with higher SES. There was also a small but significant difference in the level of parents' concerns between SES-levels (median value range: 1.29 to 1.67, $p < 0.001$), but not in the perceived need for support (parents: 1.07 to 1.16; nurses: 1.19 to 1.30). The extreme-groups comparison followed almost

the same pattern: significant differences in overall risk assessment ($p < 0.001$) and parental concerns (median value 'reported': 1.93 versus 'everything OK': 1.32, $p = 0.043$). There was a discrepancy in the perceived need for support: the reported children's parents did not differ from the 'everything OK' children's parents (1.13 vs 1.07, $p = 0.60$), but the need for support as perceived by the CHC nurse was far higher for the reported children's group (1.60 vs 1.19, $p = 0.006$). Table 5 shows the professional judgement of perceived need for support per domain, separately for the extreme groups and for the different SES-levels. The judgment was dichotomized for better readability into mild support (percentage information wanted / personal advice / counselling) and intensive support (percentage intensive help/ immediate intervention required). The reported group differed from the 'everything OK' group mostly in the domains related to the parent and family (parenting approach, living environment, social contacts, day care for child, concerns communicated by others, family issues, was any topic forgotten?). Lower SES-groups differed in a similar way from the higher SES-groups.

Furthermore, we found a difference in overall risk between children with and without completed self-report questionnaires. The group with completed questionnaires formed 66.9% of the total group, but included only 34.8% of the high risk labels. The group without questionnaires thus formed 33.1% of the total group, with 65.2% of the high risk labels. This difference in distribution is highly significant ($p < 0.001$).

User experience

The survey on user experience was completed for a total of 211 contacts. Parents reported on 100 contacts, CHC professionals on 179 contacts. After removing incomplete surveys, 86 parent-completed and 177 CHC nurse completed surveys remained. Completing the survey took parents on average 5.2 minutes, and nurses 7.5 minutes. Both parents and CHC nurses were positive about using the SPARK (satisfied or very satisfied about the contact: parents 94.2%; nurses 91.5%). Nurses succeeded in using the structured approach of the SPARK reasonably well to very well in 92.1% of the contacts. Despite the fact that the SPARK structured the visit, most parents and CHC nurses found the visit very relaxed (89.6% and 65.6%). More than half of the parents regarded the information given during the visit as useful (66.3%) and tailored to their needs (58.1%). The majority of the parents (95%) reported that all relevant topics had been sufficiently discussed. CHC nurses reported that using the SPARK provided them with information they would not have collected without using such a structured instrument, especially regarding topics related to family matters (25.4% of the contacts), parenting approach (15.8%) and concerns communicated by others (11.9%). The results of the survey were discussed with the same expert group of CHC nurses that had helped develop the SPARK ($n = 8$) (15). The results of the survey and this discussion resulted in the following comments on using and improving the SPARK. The SPARK supports the CHC nurse in making difficult visits: it ensures that nothing is forgotten, and helps in asking tough questions. Asking for the concerns and needs of par-

ents gives much additional information in families with problems, which helps in deciding what care should be offered to these families. However, in families where everything is OK, the SPARK was found to be too rigid. Furthermore, the expert group reported that the wording of the answering categories of the question whether parents experienced had any concerns, questions or problems in the last six months needed improvement.

Table 1. Population characteristics (data only from the consent group, n = 1721).

Child characteristics	
Male/female	53.5% / 46.5%
Place in family order	
first child	41.7%
second child	36.7%
third child	13.8%
four or younger child	7.8% (max 12 children)
Family characteristics	
Two parent household	92.5%
One parent household	3.1%
Shared household	2.7%
Other (foster family/adoption/divorcement/ living with grandparents)	1.7%
Parent characteristics	
Age mother (mean in year, SD)	30.5 (SD 4.8)
Mother age < 20 yr at birth of this toddler	0.7% (n = 13)
Age father (mean in year, SD)	33.4 (SD 5.8)
Father age < 20 yr at birth of this toddler	0.3% (n = 6)
Ethnicity: non-Dutch mother	8.7%
Ethnicity: non-Dutch father	7.8%
Language: non-Dutch used at home by mother	9.0%
Language: non-Dutch used at home by father	7.5%
Education	
Low education	19.4% mother (including 2.3% very low) 21.2% father (including 1.9% very low)
Intermediate education	52.5% mother / 50.7% father
High education	28.1% mother / 28.1% father
Employment	
Employed	72.7% mother / 92.9% father
Unemployed	1.1% mother / 0.9% father
Unemployable/unable to work	0.6% mother / 0.8% father
Stay-at-home mother/father	25.3% mother/ 0.8% father

Table 2. Scores per domain on parents' concerns, needs assessment by parents and professional.

Domains: (percentages)	Parents' concerns	Perceived need of support				<i>p</i> -value*
		Parents assessment*		Professional assessment*		
	concerned/ very concerned	information wanted/ personal advice/ counseling	intensive help/ immediate intervention required	information wanted/ personal advice/ counseling	intensive help/ immediate intervention required	parents vs professional
Infancy review	15.3	5.5	0.9	7.0	0.6	0.07
Health and development						
Somatic health	5.4	11.4	0.8	17.9	0.9	<0.001
Motor development	1.0	11.8	0.4	23.2	0.3	<0.001
Language, speech and thought development	0.8	20.9	0.2	39.7	0.2	<0.001
Language use of parents	1.7	11.1	0.3	23.9	0.3	<0.001
Emotional development	2.5	22.4	0.2	38.6	0.3	<0.001
Child-parent interaction						
Contact between child and others	0.7	8.9	0.2	16.7	0.1	<0.001
Child behaviour	5.0	27.7	0.3	47.7	0.3	<0.001
Parenting approach	2.9	22.0	0.4	37.4	0.6	<0.001
Developmental stimulation	0.4	11.6	0.2	27.1	0.1	<0.001
Time spending	0.7	6.3	0.5	13.3	0.4	<0.001
Family and environment						
Living environment	3.4	3.0	0.9	7.2	0.7	<0.001
Social contacts	1.2	3.1	0.2	5.1	0.5	<0.001
Day care for child	1.2	2.0	0.1	4.4	0.3	<0.001
Concerns communicated by others	1.3	2.4	0.3	5.1	0.3	<0.001
Family issues	8.8	7.7	1.7	14.1	2.3	<0.001
Was any topic forgotten?	2.5	15.7	0.2	18.7	0.4	<0.001

*The 6-point assessments of parents and professional were dichotomized for readability; category 'no help needed' was omitted. The comparison using Wilcoxon signed ranks test was on the full 6-point scale.

Table 3. Intra-class correlations for the interrater reliability of SPARK-domains.

domain	ICC
infancy review	0,953
somatic health	0,834
motor development	0,929
language, speech and thought development	0,877
language use of parents (second language, mother tongue)	0,801
emotional development	0,772
contact between child and others (both children and adults)	0,735
child behaviour	0,899
parenting approach	0,618
developmental stimulation and early/preschool education	0,922
how the child spends his/her time	0,943
living environment in and outside the home	0,931
social contacts and informal support	0,908
day-care for the child	1,000
concerns communicated by others	0,763
family issues	0,857
overall risk assessment	0,925

Table 4. Convergent validity: correlations between perceived need for support on SPARK-domains and domainscores on self-report questionnaires.

perceived need for support (from CHC nurse)	Spearman's rho	ASQ communication	ASQ gross motor	ASQ fine motor	ASQ problem solving	ASQ personal social	ASQ general	ASQ:SE total	ASQ:SE general	KIPPPI total score	KIPPPI Life Events	NOSIK
infancy review	Corr. ,083 Sig ,005	-,047 ,110	-,037 ,212	-,073 ,013	-,049 ,101	-,024 ,412	,069 ,019	-,095 ,001	,108 ,000	,087 ,004	,066 ,027	
somatic health	Corr. ,100 Sig ,001	-,045 ,129	-,079 ,008	,017 ,569	-,042 ,159	-,033 ,267	,084 ,005	-,103 ,000	,043 ,148	,006 ,844	,029 ,329	
motor development	Corr. ,135 Sig ,000	-,104 ,000	-,224 ,000	-,075 ,011	-,053 ,076	-,060 ,045	,051 ,087	-,052 ,081	,057 ,057	,056 ,061	,022 ,465	
language, speech and thought development	Corr. ,124 Sig ,000	-,305 ,000	-,036 ,226	-,125 ,000	-,093 ,002	-,022 ,467	,071 ,017	,027 ,361	,128 ,000	,007 ,810	,045 ,128	
language use of parents	Corr. ,003 Sig ,956	,102 ,093	,063 ,298	-,076 ,210	-,072 ,249	-,015 ,807	,150 ,013	-,038 ,532	,044 ,479	,104 ,096	,000 ,990	
emotional development	Corr. -,019 Sig ,527	-,028 ,352	-,036 ,226	-,088 ,003	-,030 ,315	,025 ,410	,086 ,004	-,060 ,045	,141 ,000	,045 ,135	,168 ,000	
contact between child and others	Corr. ,010 Sig ,736	-,031 ,290	-,004 ,891	-,019 ,524	-,091 ,002	-,019 ,529	,093 ,002	-,042 ,156	,127 ,000	,052 ,086	,112 ,000	
child behaviour	Corr. ,002 Sig ,945	,024 ,423	-,012 ,684	-,042 ,156	-,062 ,038	-,030 ,319	,148 ,000	-,159 ,000	,210 ,000	,046 ,123	,149 ,000	
parenting approach	Corr. -,003 Sig ,929	-,062 ,037	-,023 ,429	-,049 ,098	-,069 ,022	-,002 ,950	,139 ,000	-,060 ,043	,167 ,000	,068 ,025	,156 ,000	
developmental stimulation	Corr. ,043 Sig ,150	-,084 ,005	-,058 ,051	-,069 ,020	-,061 ,042	-,003 ,910	,097 ,001	-,051 ,086	,098 ,001	,011 ,722	,018 ,555	
how the child spends his/her time	Corr. ,012 Sig ,677	-,036 ,230	-,029 ,327	-,080 ,007	-,072 ,017	-,041 ,176	,074 ,013	-,077 ,010	,096 ,001	,023 ,441	,108 ,000	
living environment in and outside the home	Corr. ,016 Sig ,586	-,034 ,257	-,027 ,368	-,070 ,019	-,069 ,022	-,025 ,409	,052 ,079	-,061 ,042	,050 ,099	,104 ,001	,044 ,143	
(social contacts and informal support	Corr. ,043 Sig ,149	-,048 ,105	-,024 ,423	-,073 ,014	-,033 ,275	,000 ,992	,042 ,160	,013 ,664	,069 ,022	,130 ,000	,081 ,006	
day-care for the child	Corr. ,005 Sig ,855	-,031 ,304	-,018 ,551	-,053 ,075	-,025 ,405	,005 ,855	,046 ,121	-,053 ,076	,061 ,044	,075 ,014	,063 ,036	
concerns communicated by others	Corr. ,046 Sig ,119	-,072 ,016	-,046 ,121	-,047 ,118	-,049 ,101	-,048 ,108	,064 ,033	-,105 ,000	,041 ,168	,022 ,465	,025 ,399	
family issues	Corr. ,042 Sig ,162	-,041 ,163	,009 ,760	-,021 ,490	,001 ,967	-,017 ,575	,084 ,004	-,060 ,045	,048 ,112	,230 ,000	,140 ,000	
was any topic forgotten?	Corr. ,022 Sig ,688	,124 ,024	,026 ,642	-,007 ,903	,040 ,475	,163 ,003	,045 ,418	-,111 ,045	-,019 ,735	,035 ,527	,061 ,267	

Corr = Spearman's correlation. Sig= significance. Negative correlations are caused by differing scoring directions.

Table 5. Perceived need of support (professional assessment*) for extreme groups and SES-levels.

% mild support / % intensive support *	'Everything OK' group	Reported Group	SES: very low n = 46	SES: low-avg n = 433	SES: average n = 1237	SES: avg-high n = 83	SES: high n = 22	SES: very high n = 38
infancy review	10.0 / -	7.7 / -	- / -	6.7 / 0.8	7.1 / 0.6	4.9 / 1.2	13.6 / -	10.5 / -
somatic health	24.6 / 3.3	7.7 / 15.4	19.0 / -	18.2 / 0.7	18.0 / 1.1	18.6 / 1.2	9.0 / -	7.9 / -
motor develop- ment	28.3 / -	30.8 / -	22.0 / -	22.6 / -	23.4 / 0.4	22.5 / -	27.3 / -	15.8 / 2.6
language, speech and thought development	36.7 / -	23.3 / 7.7	38.1 / -	39.3 / -	40.9 / 0.4	38.3 / -	31.8 / -	52.6 / -
language use of parents	14.3 / -	25.0 / -	28.6 / -	37.0 / -	21.1 / 0.4	31.2 / -	- / -	16.7 / -
emotional development	49.2 / -	46.2 / -	40.5 / -	39.7 / -	39.6 / 0.5	32.9 / -	54.5 / -	18.4 / -
contact between child and others	22.0 / -	7.7 / -	21.4 / -	22.1 / -	15.5 / 0.1	46.9 / -	22.7 / -	10.5 / -
child behaviour	52.5 / -	38.5 / -	61.9 / -	46.6 / 0.5	48.0 / 0.5	46.9 / -	40.9 / -	39.5 / -
parenting approach	34.4 / -	61.5 / -	64.3 / -	35.5 / 0.5	35.5 / 0.5	21.0 / -	45.5 / -	28.9 / -
developmental stimulation	23.7 / -	30.8 / -	31.0 / -	28.1 / -	27.9 / 0.1	13.6 / -	18.2 / -	18.4 / -
how the child spends his/her time	10.3 / -	16.7 / -	21.4 / -	16.6 / 0.3	11.8 / 0.4	13.6 / -	13.3 / -	13.2 / -
living environ- ment in and outside the home	6.7 / -	36.4 / -	2.4 / -	11.2 / 0.5	6.7 / 0.7	4.9 / -	4.5 / -	5.4 / 2.6
social contacts and informal support	3.2 / -	- / 8.3	2.4 / -	7.2 / 0.3	5.5 / 0.5	4.9 / -	- / -	- / -
day-care for the child	6.6 / -	16.8 / 8.3	9.5 / -	5.5 / -	5.9 / 0.4	2.5 / -	4.5 / -	5.3 / -
concerns communicated by others	6.9 / -	33.4 / 8.3	7.1 / -	5.3 / 0.3	5.8 / 0.4	3.7 / -	- / -	2.6 / -
family issues	4.9 / -	58.3 / 25.0	9.2 / 2.4	17.6 / 2.8	14 / 2.5	8.6 / -	13.6 / -	10.5 / -
was any topic forgotten?	22.2 / -	- / 20.0	- / -	25.9 / -	18.0 / 1.0	10.0 / -	22.2 / -	3.3 / -

*values indicate percentage mild support (information wanted / personal advice / counselling) and percentage intensive support (intensive help/ immediate intervention required); category 'no help needed' was omitted. SES = socio-economic status; SES-category 'low' had no cases. Avg = average.

Discussion

This study assesses the psychometric properties of the SPARK, a structured interview developed to assess parenting and developmental problems in young children. The inter-rater reliability was found to be very good to excellent, especially for the overall risk assessment and the physical domains. The SPARK showed to be discriminative, by distinguishing between areas with different SES-levels and between postal codes (representing both SES and urbanization). There were clear differences between extreme groups: children reported to the child protective services versus children with positive scores only on all questionnaires. The only psychometric property that was below expectation was the convergent validity. Correlations of SPARK-domains with related domains in the self-reported questionnaires were significant, but very low. Although they showed the expected pattern, no correlation exceeded 0.3. This lack of convergence is probably influenced by several aspects. Firstly, the content and the way of questioning differed quite a lot between the SPARK and the self-report questionnaires. Secondly, the majority of the children had no problems. Thirdly, the group that did not return the questionnaires included a large part of the children with a high risk. Both parents and CHC nurses were positive about the SPARK. CHC nurses reported that the SPARK gave practical information and supported them during visits with problem families. They also identified several areas of improvement for the SPARK: its rigid structure and the wording of some questions.

Several authors support our opinion that an assessment of parents' concerns and their need for support should be done in dialogue with the parents (32-34). 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. This professional helps the parent with arranging and judging concerns and problems. The only instrument that has a somewhat similar approach to the SPARK is the Parents' Evaluations of Developmental Status (PEDS) by Glascoe (33, 35). However, there are some major differences between the PEDS and the SPARK. The PEDS is a short 10-item questionnaire to be completed before a visit to a pediatric clinic using a self-report or interview (33, 35). The answers are then discussed by the nurse or pediatrician. The SPARK differs from the PEDS in that it is a conversation between parent and professional in order to clarify care needs and to jointly decide on subsequent care. Both the parents and the professional rate their perceived need for support, which is important in situations when parents are avoiding care and to reveal differences in the perceived need between parents and professional. Furthermore, the SPARK has a broader scope, including also the child's environment. Finally, the SPARK results in an overall assessment of risk for parenting and developmental problems. Whether the SPARK is preferable to self-report questionnaires needs to be determined. The duration of administering the SPARK is about double that of the regular time spent in a visit to the well-baby clinic. This will hamper implementation, in the Netherlands as well as in other countries. Further research is needed on whether implementing the SPARK is cost-effective. Three arguments are in

favor of the SPARK: a) in our current study we observe a response bias, as especially the parents with a child labeled as high risk by the nurse did not return the self-report questionnaires, b) the interview gives nurses the possibility to ask not only about the child, but also about the (functioning of) the family. Nurses reported that this part in particular gave them new information relevant for deciding which care and support should be offered, and c) in the Netherlands there is a growing aversion among parents to self-report questionnaires. Parents regard preventive child health care increasingly as a system for detection of child abuse and neglect, instead of as a care provider that supports parents of young children (36). This threatens the high reach (>95%) that the Dutch system has traditionally had between 0–4 years. The interactive procedure of the SPARK (i.e. listening to the parent and making a shared decision about subsequent care) may help in re-establishing the trust of parents in preventive child health care.

This study has several limitations. The low convergent validity needs further attention. In addition to the reasons stated above, some other aspects play a role. Firstly, although the response rate for the self-report questionnaires was quite high, there was selective nonreporting: about two-thirds of the children with a label of high risk were part of the one-third that did not return questionnaires. This may have negatively influenced the convergent validity, as the group with expected high scores in both the SPARK and the self-report questionnaires did not contribute to the correlations. Interestingly, this lower response rate showed that the SPARK identifies a large group of children with high risk for parenting problems, which would have been missed by using only self-report questionnaires. Reasons for not returning the questionnaires are unknown, but may include causes as diverse as lack of skills to complete a self-report questionnaire, stress within the family, or not wanting to write about problems within the family. Secondly, we were limited in choosing suitable questionnaires as there is a lack of validated questionnaires for this age group in the Dutch language. Some of the instruments used for assessing the convergent validity have been validated only partially (the KIPPPPI, which is used extensively in the Netherlands) or have not been validated for this age group in the Netherlands (ASQ and ASQ:SE). This limits the interpretability of the convergent validity. Thirdly, the lack of convergence may also have been caused by the broad scope of the SPARK compared to the more limited self-report questionnaires.

Another limitation is that, although the province of Zeeland resembles a large part of the Netherlands, it may not be representative of some highly urbanized areas elsewhere in the Netherlands. The validity and feasibility of the SPARK in urbanized, multi-ethnic areas should also be studied. Also, this was a cross-sectional study without follow-up. Further study is required to assess the predictive validity of the SPARK and long-term outcomes.

Conclusion

The SPARK is a structured interview that assesses parents' concerns and their need for support using both the parents' perspective and the experience of the CHC nurse. The

SPARK discriminates between children with a high, increased and low risk for parenting and developmental problems in a reliable way. The SPARK is practicable and provides useful information which helps to decide, together with the parents, what care is needed in a family. The users are satisfied, but there is room for improving the instrument. Several aspects of the SPARK such as predictive validity, construct validity, cost-effectiveness and discriminative validity in other samples require further study. By using only self-report questionnaires, a large part of the children with a high risk on parenting and developmental problems is left out.

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Chapter 4

What is the predictive value of the risk assessment included in the SPARK concerning child abuse and neglect?

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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 1850 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.

Background and objectives

The well-being of young people in the Netherlands compared to other countries seems to be at a very high level (1). Recent studies in the Netherlands, in which trained professionals in a variety of life 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% (2). 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 (3-5). 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 (6) 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 (7) 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 (8); relative risk 8.41 at 1 year of age and 5.19 at 2 years). In an earlier review (9) 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% (10).

An example of the 'proxy-approach' is the Child Abuse Potential Inventory (CAPI) (11) and a 20-item scale based on the CAPI (12). 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 (13). In the scale of Grietens et al. (12), 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 (14). 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 (15, 16) (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. (17). 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 (18, 19). 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 (20–22). 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 (6). 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 (23). 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 (24). 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 actu-

ally 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 (6). 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. (23) 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 (6): 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 (24).

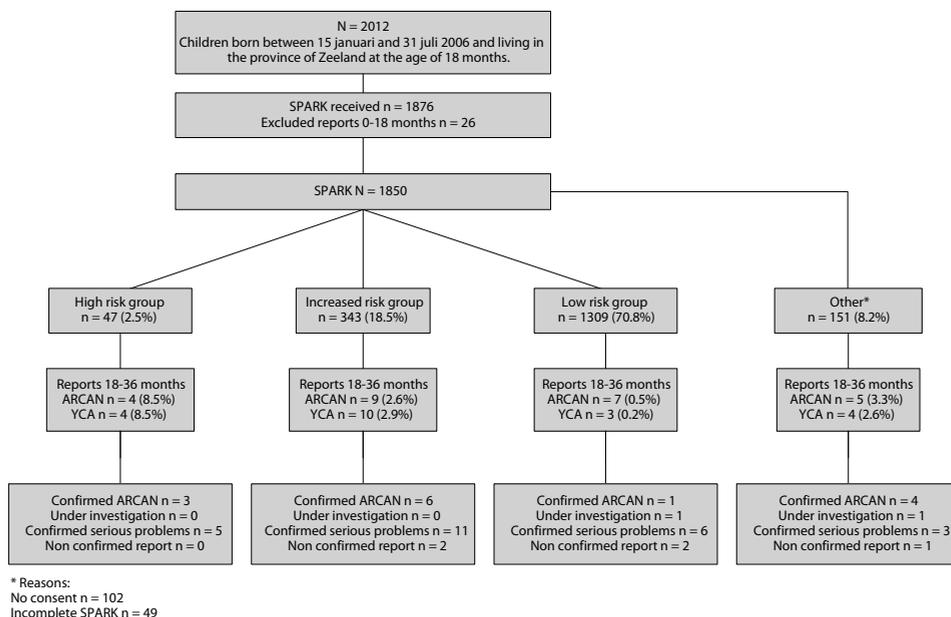
All children in our validation sample were checked in the registries of ARCAN and YCA. For all children in the sample known with ARCAN or YCA the following data were recorded: date of report, type of reporter, date of finishing the report, and the conclusion on the report (i.e., whether the report or 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 (26). The association of the SPARK with the reports to the child protection services (both ARCAN and YCA) was assessed by binary logistic regression analyses (27). 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 (6); (b) the risk assessment (low, increased, and high risk); (c) single ‘known risk factors’, from the demographic characteristics of the children in our sample (28, 29) 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 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.

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



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. 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.

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

Child characteristics (percentages)	No report (n = 1662)	Confirmed report ARCAN (n =10)	Confirmed report YCA (n = 14)	p-value*
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 (percentages)				< 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 (percentages)				
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 94.0 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	70.0 mother -	35.7 mother -	< 0.01 mother 0.99 father

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

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

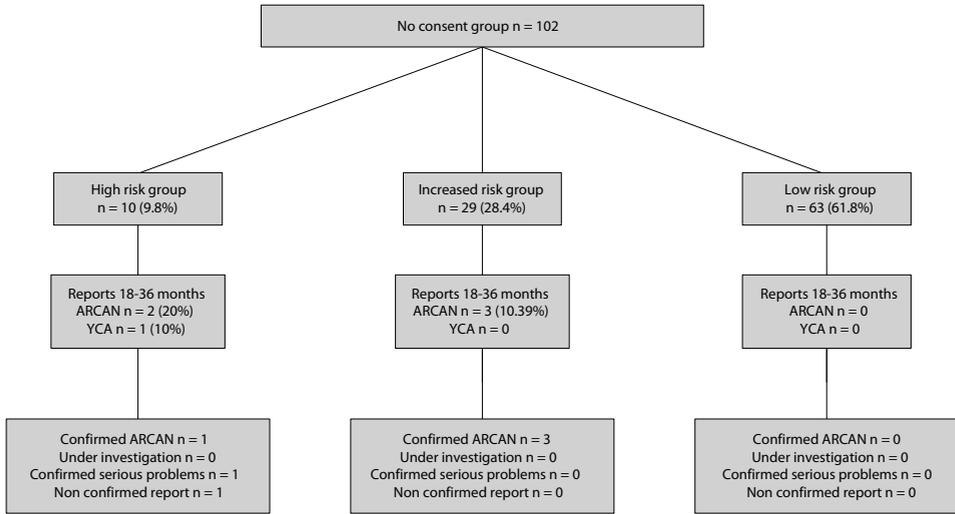


Table 2. Odds ratios (95% CI) and *p*-value of predictors for a report to ARCAN or YCA in the univariate logistic regression analysis.*

	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

*Only significant predictors are reported.

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

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 to 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 <i>R</i> ²	0.24	

*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 practi-

tioners, paramedics and predominantly by CHC itself (about 80%) (6, 30). 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 (26, 29, 31, 32).

In population screening, a high coverage is important. The high reach of preventive CHC in the Netherlands (33) 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 (18, 19). Early signs of this deregulation process can be manifold and show in many areas of the functioning of child and/or parents (3). 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 re-

port 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 (34).

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 (6, 24). 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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The added value of a home visit and the newly developed instrument compared to a visit to the well-baby clinic for early detection of parenting and/or developmental problems in toddlers

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PART B

Chapter 5

In comparison with a visit to the well-baby clinic, does a home visit improve the early detection of parenting and/or developmental problems in young children?

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Early detection of parenting and developmental problems in toddlers: a randomized trial of home visits versus well-baby clinic visits in the Netherlands

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Abstract

Objective The early detection of parenting and developmental problems by preventive child health care (CHC) services in the Netherlands takes place almost exclusively at the well-baby clinic. This study assesses whether, compared to a visit to the well-baby clinic, a home visit improves early detection.

Methods 4481 eligible 18-month-old children and their parents were randomized to either a visit to the well-baby clinic or a home visit in the period from December 2006 to January 2008. A CHC nurse held structured interviews using the validated Structured Problem Analysis of Raising Kids (SPARK). Differences in the percentage of children with high or increased risks of parenting and developmental problems as assessed by the SPARK were analyzed with ordinal regression. Secondary outcomes included the percentage of parents attending, parents' concerns, needs assessment by parents and CHC professionals and user experience.

Results Response rates were 94.0% for the home visit group and 93.2% for the well-baby clinic group. Using the SPARK at home identified significantly more high-risk children compared to clinic visits (3.7 vs. 2.6%) and fewer children with increased risk (19.1 vs. 20.7%; overall $p = 0.028$). Home visits more often involved both parents and other children. At home, parents reported more concerns. Both parents and CHC nurses more often expressed the need for support and reported significantly better experiences at home.

Conclusions Aided by a validated structured interview, CHC professionals detect more children with high risks of parenting and child-developmental problems during home visits than during clinic visits.

Background and aims

An estimated 10-25% of children below the age of four experience varying degrees of problems related to parenting and/or psycho-social development (1-5). This requires serious attention; the sooner an intervention takes place, the more effective it will be (6, 7). Early intervention should be based on accurate detection and suited to the problem identified (8). For the early detection of parenting problems and developmental problems in young children, preventive child and youth health care (CHC) services offer an excellent environment: contact with these services is standard practice for young families in the Netherlands—families are automatically registered and services are highly accessible (9-12).

To facilitate the early detection of parenting problems and developmental problems in young children, we recently developed and validated a structured interview: the Structured Problem Analysis of Raising Kids (SPARK) (5, 13, 14). It is aimed to promote shared decisions about further care made by parents and CHC professionals. The SPARK was developed in close collaboration with CHC nurses. This process and first results have been described in a previous publication (5). The SPARK has proven to be a feasible and reliable instrument, with effective discriminative and predictive validity (13, 14).

In the Netherlands, early detection of parenting and developmental problems in CHC almost exclusively takes place at the well-baby clinic. However, it is debated whether this is the best place; home visits may be more effective for early detection of parenting and developmental problems (15, 16). Assumed advantages of home visits are that more and better information may be obtained about a family's situation and housing conditions and about the interaction between child and parent(s), that more parents may attend and that parents and children may be 'more at ease', as they remain in their own familiar environment. However, evidence about the added value of home visits is lacking (15). During the past decades, home visits have been introduced and scaled down several times, so scientific evidence is needed to inform policy makers on this topic. This study addresses the question whether, compared to a visit to the well-baby clinic, a home visit improves the early detection of parenting problems and developmental problems in young children. To establish this, validated interviews were held on both locations. We also assessed user experience reported by parents as well as CHC professionals on both locations.

Methods

Design

We set up a non-blinded trial in which 18-month-old children were randomized for either a visit to the well-baby clinic or a home visit. All children living in the Dutch province of Zeeland in the period from December 2006 to January 2008 were eligible for participation. Once a month, the municipal population register was consulted to identify all children who would reach the age of 18 months in the following month.

A practice assistant entered the children in a secured online randomization module provided by the Data Management Department of the Julius Center for Health Sciences, Uni-

versity Medical Center Utrecht. This module automatically randomized the children for a home visit or a well-baby clinic visit, stratified on CHC nurse (Figure 1). Randomization results were communicated to the CHC nurses and the research team. The CHC nurse contacted parents for their child's regular check-up at 18 months and included an information letter explaining the aim of the visit and the study. For both locations (home and clinic), time available for the SPARK was 30 minutes.

Visits started with the SPARK, with the primary goal of assessing parents' concerns and deciding together which care was needed by the child and its parent(s). Interviews were followed by a request for informed consent to use recorded information for scientific research. This specific order of events was a deliberate choice; it could have been uneasy for the parents and the CHC nurse to discuss parents' concerns and necessary care after informed consent had been denied. As the situation concerned a regular visit that required active participation by parents and CHC nurse, blinding was impossible. The Medical Ethical Review Committee of the University Medical Center Utrecht gave a positive advice for this study, including the consent procedure (protocol number 06-290/C dated October 31, 2006). The study was registered at the Netherlands Trial Register (<http://www.trialregister.nl>), NTR1413.

The research team recorded all deviations from the randomization schedule, and nurses were asked to explain deviations. To ensure maximum response, parents who had not responded to the initial invitation were contacted via a standardized protocol used in daily practice indicating how to handle non-attending parents, with or without notice.

To assess user experience, we administered a short questionnaire used earlier by Caris (17) on CHC nurses' skills to increase parents' parenting competences. Parents and nurses gave their opinions about the quality of the visit through questions about nurses' skills (divided into active listening, active talking and interview skills), reduction of tension and participation of parents. During November 2007, parents and CHC nurses were asked to complete this questionnaire online after each visit.

Outcome measures

The primary outcome concerned differences in the percentage of children with high or increased risks of parenting and developmental problems as assessed by the SPARK.

Secondary outcomes included the percentage of parents attending, parents' concerns, needs assessment by parents, needs assessment by CHC professionals and user experience. The SPARK is an interview held by CHC professionals with one both parents about their concerns and resulting in a joint decision about any form of further care. During the SPARK development study, nurses were trained in using the tool during a four-hour training session followed by supervision sessions. A full description of the SPARK is available in the development paper (5). In short, the SPARK consists of a structured dialogue on 16 subject areas covering the child, its family and the child rearing environment (Table 2). The SPARK uses a three-step model: Step 1: detection of concerns; Step 2: clarifying the

characteristics and impact of the concerns in dialogue with the parents and discussing needs for support; Step 3: analysis and shared decisions on what to do next. After a visit, the CHC nurse makes an overall risk assessment based on information retrieved during the interview and on an elaboration of factors that might positively or negatively influence the risk assessment. These factors involve observation of parent-child interaction, growth, developmental status, the environment, and manifest problems.

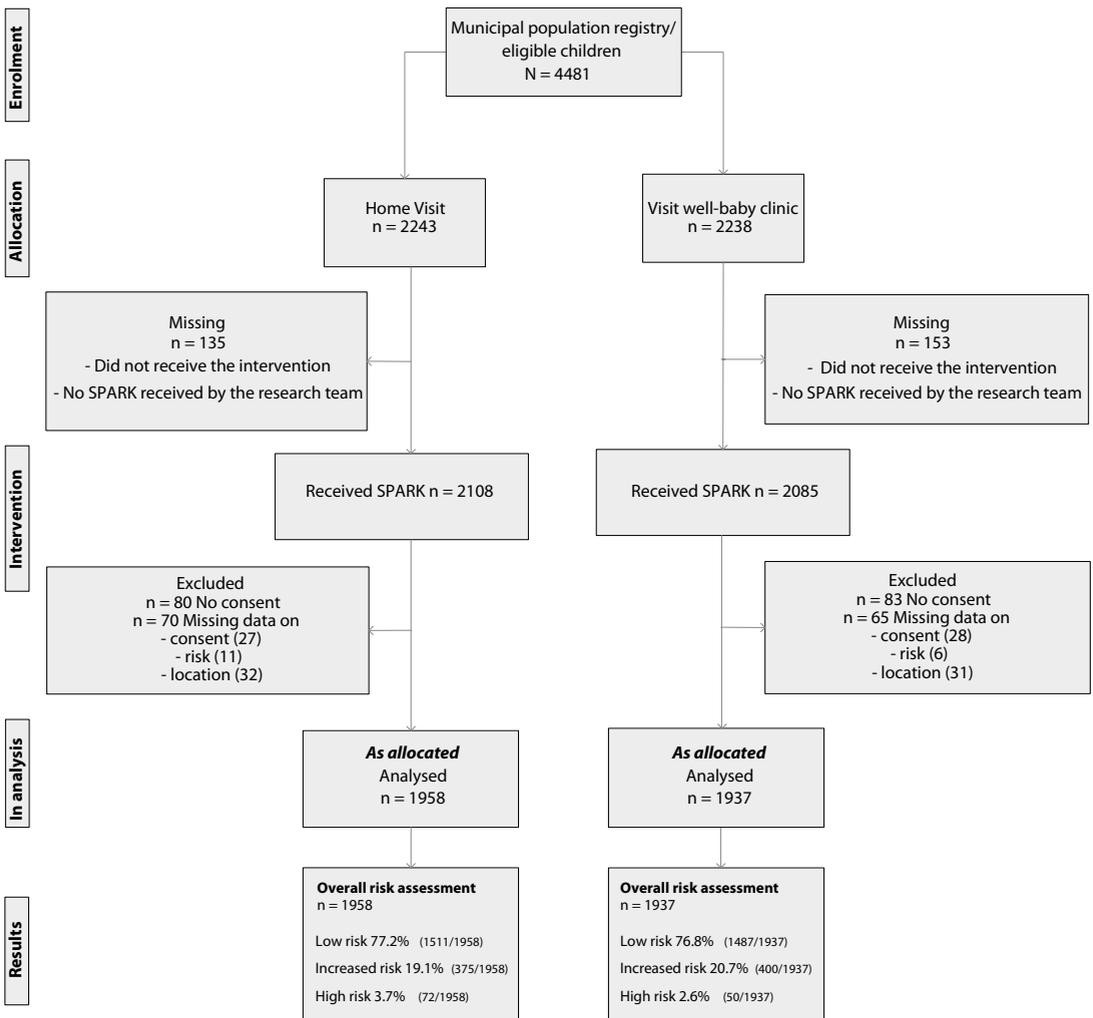
A cross-sectional study with a 1.5-year follow-up showed the SPARK to be a feasible, valid and reliable instrument (14). The validation study was conducted with the second half of the children included in the RCT described in this article. Inter-rater reliability among trained nurses was good to excellent, with intra-class correlations varying between 0.6 and 1.0 for all SPARK topics and 0.93 for the risk assessment (14). The SPARK's risk assessment proved to be a strong predictor for confirmed reports of child abuse and neglect made to the Advice and Reporting Centers for Child Abuse and Neglect and also for confirmed reports made to the Youth Care Agency in the 1.5 years after completing the SPARK (odds ratio of high versus low risk: 16.3). The specificity and negative predictive value of risk for a confirmed report were high (high risk: 0.97 and 0.99, increased risk: 0.80 and 0.99)(13).

Sample size calculation and statistical analysis

Based on risk scores found in the developmental study of the SPARK (5) and what we assume to be a relevant difference, a difference of 3% in high + increased risk between home and clinic visits was used to calculate sample size. Detecting 3% difference with an alpha of 0.05 and a power of 0.90 required 2006 children per group (18). Taking 10% non-response into account meant that 4400 children needed to be included. Population characteristics were analyzed using descriptive statistics. Differences in characteristics between risk groups and differences in attendance and place of visit were assessed using χ^2 , Anova or a Mann-Whitney U-test. The difference in the number of children with high, increased and low risks between the two locations was computed using ordinal regression analysis with a proportional odds model (19). The allocated visit and the stratification variable (nurse performing the visit) were used as independent variables. Due to the unequal distribution of the response categories, negative log-log was the most appropriate link function (lower categories more probable) instead of the better known logit link function (20, 21). Several authors have argued that no odds ratios can be obtained from a negative log-log model (20, 21). As a direct interpretation of the effect estimate is impossible, we used the observed (raw) difference in frequencies to interpret the difference between the trial arms. As randomization was done for the entire population before requesting consent, we did not have data from the group of non-responders and could not use the data from the no-consent group. The remaining group was analyzed on an intention-to-treat basis (22). Additionally, we performed a per-protocol analysis (i.e. omitting the deviations from randomization). Furthermore, in order to understand the observed difference in risk assessment between home and clinic visits, we described which factors positively

or negatively influenced the overall assignment of risk between the two conditions. User experience of parents as well as CHC nurses was analyzed using descriptive statistics. Differences in experience between location (home or clinic) were assessed using a Mann-Whitney U-test. Data analysis was carried out using SPSS version 20. A *p*-value below 0.05 was considered significant.

Figure 1. Flow diagram of a randomized trial of home visit versus well-baby clinic visits in the Netherlands: Early detection of parenting and developmental problems in toddlers.



Results

During the study period, 4481 eligible children resided in the province of Zeeland. Of this group, 2243 were randomized to a home visit and 2238 to a visit to the well-baby clinic (Figure 1). For 288 children (6.4%: 288/4481), no data were available. This was partly because parents were not or could not be invited (for example due to an omission by the CHC nurse or because the address in the municipal population register was incorrect) and partly because the research team had not received the SPARK (135 home visit vs 153 well-baby clinic visits). For another 135 children, the SPARK was incomplete: the CHC nurse had not included consent, risk or place of visit (70 home visit vs 65 well-baby clinic visits). For 163 children (3.6%: 163/4481), no consent was given (80 home visit vs 83 well-baby clinic visits). Analysis was carried out on 3895 children (1958 home visit vs 1937 well-baby clinic visits). Population characteristics were similar in both groups; these are presented in Table 1.

Of the planned home visits, 90.0 % (n = 2018) were performed at home, 0.9 % (n = 20) were performed at the clinic, 3.1 % (n = 70) were excluded from analysis because of missing data and 6.0 % (n = 135) were not performed due to non-response. Of the visits to the well-baby clinic, 87.4 % (n = 1956) were performed at the clinic, 2.9 % (n = 64) were performed at home, 2.9 % (n = 65) were excluded from analysis because of missing data and 6.8 % (n = 153) were not performed due to non-response. The difference in deviation from the assigned location proved to be significant ($p < 0.0001$). Reasons mentioned by nurses for deviating from the assigned location were strong suspicions that a parent would not show up at the clinic, the wish to see the home environment, the wish to observe child and parent interaction in their own home, miscommunication, and finally parents insisting on changing the location of the visit. A closer look at the group that deviated from the assigned location (n = 84) showed a different distribution of risk assessment and consent. This group contained more children with increased (36.9%: 31/84) and high risks (9.5%: 8/84); for 15 children, no consent was given (17.9%: 15/84). These differences were strongest in the group that deviated from assignment to the well-baby clinic.

In most cases, mothers were present (home visit 97.7%: 1911/1958 versus clinic visit 95.0%: 1841/1937; $p < 0.001$); fathers were present in fewer cases (home visit 18.6%: 364/1958 versus clinic visit 15.5%: 301/1937; $p = 0.011$). Both parents were present during 16.9% (330/1958) of the home visits and in 11.4% (220/1937) of the clinic visits ($p < 0.001$). Other children from the same family were also more often present at home (28.0%: 549/1958) than at the clinic (22.8%: 442/1937) ($p < 0.001$). Completing the SPARK took an average 34.1 minutes (sd 11.6 min.) at home and 25.2 minutes (sd 8 min.) at the well-baby clinic. The first step of the SPARK involves asking parents whether they have experienced any concerns. Topics mentioned the most were 'infancy review' and 'family issues' (Table 2; column 2). Parents generally reported their perceived concerns more often at home than during a visit to the clinic. The second step in administering the SPARK concerns asking parents as well as the professional about the currently perceived need for support. Par-

ents expressed more need for support at home (Table 2; columns 3–4). The need for advice/consultation was most prominent in topics related to child-parent interaction (parenting, behavior) and health/development (emotional development, language/speech/cognitive development, somatic health, motor development) (Table 2; column 3): for each topic, 15–30% of the parents needed some kind of support. ‘Family issues’ scored highest in terms of intensive or immediate help needed. The third step of the SPARK concerns analysis and decisions on future steps. Most follow-up actions can be taken by CHC professionals themselves within the framework of their regular contacts (home visit 79.9% versus clinic visit 77.9%); however, additional contacts were required for 19.9% versus 22.0% of the children.

Finally, the professional formulates an overall risk assessment (Figure 1). The probability of having a high, increased or low risk proved significantly different between the two locations ($p = 0.028$). The per-protocol analysis (omitting deviations from randomization) gave a similar outcome ($p = 0.030$). For high risk, the observed difference was 1.1% (home visit 3.7%, clinic visit 2.6%). Conversely, the observed difference for increased risk was 1.6% (home visit 19.1%, clinic visit 20.7%).

To better understand a CHC nurse’s risk assessment, we investigated which factors nurses elaborated upon before assigning overall risk. The data in Table 3 suggest that the major difference between home and clinic lies in better observations of home surroundings (seeing, feeling and smelling a home’s atmosphere, safety, hygiene and furnishing) and greater trust between parent and nurse (less openness shown by parents at the well-baby clinic and more problems reported during home visits, e.g. parental addiction or psychiatric problems, negative childhood experienced by parents, financial obstacles and chronic parental health problems).

The survey on user experience was completed for 211 contacts. Parents reported on 100 contacts and CHC professionals on 179 contacts. After incomplete surveys had been removed, 86 parent-completed and 177 CHC nurse-completed surveys remained. User experience showed that, according to nurses, parents were more active during interviews at home ($p = 0.046$), that nurses were more satisfied with home visits ($p = 0.014$), and that they felt more rushed during the interview at the clinic ($p < 0.001$). Parents reported higher satisfaction levels during home visits compared to visits to the well-baby clinic ($p = 0.017$).

Table 1. Population characteristics.

Child characteristics (percentages)	Home visit n = 1958	Well-baby clinic visit n = 1937	p-value*
Male / female	52.8 /47.2	53.1 /46.9	0.9
Place in family order			0.05
First child	43.6	40.2	
Second child	35.0	37.3	
Third child	13.2	14.3	
Fourth or younger child	8.2 (max 12 children)	8.2 (max 15 children)	
Family characteristics (percentages)			0.3
2-parent household	92.1	93.0	
1-parent household	3.1	3.0	
Shared household	2.7	2.2	
Other (foster-family / adoption / divorce / grandparents)	2.0	1.8	
Parent characteristics (percentages)			
Age mother (mean in year, SD)	31.95 (SD 4.9)	31.64 (SD 4.9)	0.3
Mother age < 20 yr by birth of this toddler	1.0 (n = 19)	1.5 (n = 30)	
Age father (mean in year, SD)	34.74 (SD 5.7)	34.38 (SD 5.5)	0.2
Father age < 20 yr by birth of this toddler	0.5 (n = 10)	0.7 (n = 13)	
Ethnicity: non-Dutch mother	8.4	7.7	0.4
Ethnicity: non-Dutch father	7.8	7.4	0.6
Language: non-Dutch used at home by mother	8.8	8.3	0.5
Language: non-Dutch used at home by father	7.7	7.1	0.5
Education			0.3 mother 0.2 father
Low education	19.4 mother (including 2.1 very low) 22.4 father (including 1.5 very low)	20.7 mother (including 2.4 very low) 23.6 father (including 2.4 very low)	
Intermediate education	54.0 mother 49.0 father	53.9 mother 49.5 father	
High education	26.6 mother 28.6 father	25.4 mother 26.9 father	
Employment			0.1 mother 0.7 father
Employed	69.8 mother 94.3 father	67.3 mother 94.6 father	
Unemployed	0.6 mother 0.7 father	0.7 mother 1.0 father	
Unemployable/unable to work	0.9 mother 0.8 father	0.3 mother 0.6 father	
Housewife / house husband	24.2 mother 0.6 father	27.7 mother 0.6 father	

*using Kruskal-Wallis test, with exception of age: using ANOVA.

Table 2. Parents' concerns and perceived need of support.

Domains: (percentages)	Parents' concerns:	Perceived need of support			
		From parents view*:		From professional view*:	
		concerned/ very concerned **	information wanted/ personal advice/ counseling **	intensive help/ immediate intervention required **	information wanted/ personal advice/ counseling **
Infancy review ¹	17.1/14.6	8.0/6.1	0.8/0.8	9.1/7.8	0.6/0.7
Health and development					
Somatic health	6.8/5.9	14.1/12.9	0.8/0.6	19.8/18.7	0.6/0.7
Motor development	1.6/1.3	14.5/11.0	0.5/0.2	24.4/20.4	0.4/0.4
Language, speech and cognitive development	1.1/0.8	24.4/20.7	0.1/0.2	43.0/38.8	0.1/0.3
Language use of parents ²	0.2/0.2	3.6/3.3	0.1/0	7.0/7.3	0.0/0.1
Emotional development	2.6/3.4	25.0/23.1	0.2/0.3	41.1/37.8	0.3/0.3
Child-parent interaction					
Contact between child and others ³	0.9/0.5	9.2/8.6	0.2/0.1	17.4/15.7	0.1/0
Child behavior	4.5/5.3	30.7/28.4	0.4/0.6	49.5/45.1	0.4/0.9
Parenting approach	2.7/2.5	25.5/23.3	0.6/0.6	38.1/36.9	0.7/0.9
Developmental stimulation ⁴	0.5/0.5	14.2/11.9	0.2/0.1	28.8/24.3	0.2/0.1
Time spending ⁵	1.0/1.1	7.4/6.5	0.4/0.2	14.4/12.8	0.4/0.2
Family and environment					
Living environment ⁶	4.0/2.8	3.3/3.0	1.1/0.5	8.8/6.1	0.5/0.5
Social contacts ⁷	1.8/1.3	3.8/3.1	0.2/0.3	7.6/5.9	0.2/0.3
Day care for child	1.6/1.9	3.1/2.5	0.4/0.2	6.3/5.2	0.3/0.2
Concerns communicated by others	1.5/1.0	3.3/2.8	0.2/0.2	5.7/5.2	0.2/0.4
Family issues	9.7/8.8	8.7/8.4	1.8/1.1	15.0/14.5	2.1/1.5
Was any topic forgotten?	1.6/0.8	6.6/3.6	0.2/0.1	7.3/4.5	0.2/0.2

*The 6-point assessments of parents and professional were dichotomized for readability; category 'no help needed' was omitted. **home visit (n = 1958) /visit well-baby clinic (n = 1937)

1 Reviewing past issues and discussing any problems from the infant period that are still relevant; 2 Second language, mother tongue; 3 Both children and adults; 4 And early pre-school education; 5 How the child spends his/her time; 6 In and outside the home; 7 And informal support

Table 3. Factors elaborated by CHC nurses before risk assessment.

	Home visit (n = 1958)		Well-baby clinic visit (n = 1937)	
	Positive influence	Negative influence	Positive influence	Negative influence
Child				
Developmental delays/physical health problems from infant period	20.9% (409)	13.3% (260)	20.7% (400)	11.6% (224)
Motor development	55.5% (1087)	7% (137)	55.5% (1074)	5.9% (115)
Speech and cognitive development	48.2% (944)	11.2% (219)	46.4% (899)	10.6% (206)
Eating and drinking habits	29.9% (586)	13.4% (263)	25.3% (489)	10.6% (206)
Behaviour	59% (1155)	6.3% (123)	57.5% (1113)	8.2% (159)
Interaction/exemplary behavior between parent and child	59.9% (1173)	3.7% (72)	55.5% (1076)	3.7% (72)
Child's attachment	55.9% (1094)	2.2% (42)	48.5% (940)	1.8% (35)
Other	6.5% (128)	5.9% (115)	3.2% (62)	7.6% (148)
Living environment				
Atmosphere at home	60.5% (1185)	2.2% (42)	35% (677)	2% (38)
Safety	29.7% (582)	3.2% (62)	5.8% (112)	1% (20)
Hygiene family members	35.4% (693)	0.7% (13)	15.2% (295)	0.6% (12)
Hygiene home	35.9% (703)	1.8% (36)	5.7% (111)	0.6% (11)
Furnishing	33.9% (663)	2.8% (54)	6.3% (122)	1.2% (23)
Parent(s)				
Difficult infant period experienced	16.9% (330)	15.9% (311)	18% (349)	14.4% (278)
Competence of parents	51.8% (1014)	4.6% (90)	46.1% (893)	5.5% (107)
Parents disagree among themselves	21.5% (420)	5.2% (102)	19.4% (375)	5.2% (100)
Amount of social support	40.3% (788)	6% (117)	35% (677)	5.8% (113)
Financial obstacles	14.2% (277)	4.1% (80)	11.3% (218)	3.6% (70)
Chronic health problem	10.5% (206)	4.7% (91)	8% (155)	4% (77)
Addiction	9.4% (184)	0.7% (14)	7.7% (149)	0.3% (6)
Psychiatric problems	8.3% (163)	3.9% (77)	7% (135)	2.8% (55)
Negative childhood experiences	8.7% (170)	3.6% (70)	7% (136)	2.9% (57)
Openness during the visit	49.6% (972)	1.4% (27)	44.1% (855)	2.2% (43)
Other	5.7% (111)	9.4% (184)	4.2% (82)	11.6% (224)

Discussion

This study assessed whether, compared to visits to the well-baby clinic, home visits improve the early detection of parenting and developmental problems. Assuming that the CHC professional would already have identified high-risk children, we expected the largest difference to occur in the increased risk group. However, we found more high-risk children in the home visit group and more children with increased risk in the clinic visit group. The 'extra' increased-risk children in the clinic may have been misclassified because less information was available. The clinical relevance of finding more high-risk children is that children in this group have multiple problems and are more problematic than children in the other groups, as shown by the many confirmed child maltreatment reports (13). The percentage of children with problems as identified by the SPARK is in line with findings from literature (23). We observed a significant difference in deviations from protocol: more visits planned at the clinic were performed at home than the other way around. The reasons for deviating from protocol showed how CHC nurses act in daily practice. If they suspected that a parent of a probably high-risk child would not show up at the clinic, they performed a home visit. The nurses considered seeing a probably high-risk child more important than carrying out the study as instructed, despite instruction, control and feedback received from the research team.

Our findings support the assumed advantages of a home visit. More and better information can be obtained about family situations and housing conditions and about parent-child interaction; more parents are reached, and parents and children feel 'more at ease' in their own familiar environment. Additionally, parents with simple parenting questions seemed to profit from a home visit, as they reported more concerns at home and asked more information or advice.

The small number of children that could not be contacted is indicative of the strength of CHC in the Netherlands, which reaches up to 98% of all children in their first year and 90% of all children between 1-4 years of age. Home visits for the entire population are well known. If such visits with SPARK are only initiated upon indication (as suggested by policy makers to keep costs down), we doubt whether such high response rates will be maintained, because home visiting programs on indication face barriers in terms of gaining access to people's homes, as demonstrated in a review by Peacock (24).

For the SPARK interview itself, we observed a difference in duration. During home visits, additional time was available for starting any interventions agreed upon by parent and nurse. This was impossible in the clinic, due to strict planning, tight schedules and the challenge of keeping toddler, parent and nurse concentrated in a clinic setting for more than 30 minutes. During clinic visits, new appointments needed to be made to take additional action. We assume that the additional time available explains most of the observed difference in duration.

Administering the SPARK takes more time than what is generally available during regular visits to a Dutch clinic. Furthermore, home visits require travel time and involve costs.

Therefore, the outcome of the SPARK in extended visits to the clinic should be compared with a risk assessment of parenting and developmental problems made during regular visits. Cost-effectiveness also needs to be assessed.

Existing instruments developed for use in home visiting programs include the scale developed by Grietens et al. (25) and the Home Observation for Measurement of the Environment (HOME) (26). Both are observation instruments, with the Grietens scale aimed at the detection of child abuse and the HOME at assessing the home environment. Compared to the SPARK, these tools lack the broad scope on parenting and development, and they lack the joint perspectives of parents and professionals. A number of systematic reviews and meta-analyses discuss the effectiveness of home visiting programs for disadvantaged families (27, 28), with a focus on preventing child maltreatment (29, 30) or on children's health and developmental outcomes (24). However, selection for these home visiting programs does not include any assessment of home environments and context.

Our study has several limitations. First, there were deviations from randomization. We would have preferred a 'contamination-adjusted intention-to-treat analysis', as this better estimates the efficacy of the intervention (i.e. location) in children and parent(s) who actually receive it (31). Compared with an ITT analysis, such an analysis better reflects how nurses work in daily practice, but it proved impossible to combine with ordinal regression analysis. Second, although the province of Zeeland closely resembles other parts of the Netherlands, it is not representative of highly urbanized multi-ethnic areas found elsewhere in the country. The usefulness and validity of the SPARK in such areas needs to be assessed. Third, due to financial constraints, we were unable to assess the long-term impact of the SPARK on health outcomes or costs. Long-term outcomes and costeffectiveness need to be assessed in further studies. Still, our research shows that the SPARK does indeed offer a number of advantages, such as improved detection of parenting problems at an early stage and care suited to parental needs.

Conclusions

CHC professionals using a validated structured interview detect more children with high risks of parenting and child-developmental problems during a home visit than during a visit to the clinic.

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Chapter 6

SPARK versus Care as Usual: can we speak of added value?

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Early detection of parenting and developmental problems in young children:
nonrandomized comparison of visits to the well-baby clinic with or without a
validated interview

Gesubmit

Abstract

Objective Early detection of parenting and developmental problems in young children is important. Does early detection improve with using a validated structured interview?

Methods

Design Nonrandomized controlled trial in the period of December 2006 to January 2008.

Setting Preventive Child Health Care (CHC) services in the Netherlands.

Participants 4438 eligible 18-month-old children and their parents.

Interventions A visit to the well-baby clinic with and without (usual care) using a validated structured interview for early detection of problems in parenting and development of young children: the Structured Problem Analysis of Raising Kids (SPARK)

Outcome Measures The primary outcome consists of the difference in number of 18-month-old children with high or increased risk for parenting and developmental problems. Secondary outcomes are the differences in care needs as expressed by CHC professional, the percentage of parents and other children of the family attending, follow up actions, the scores of parent report questionnaires and the time needed for the consult. Analysis was done using ordinal regression with propensity score adjustment.

Results We observed a discrepancy: professionals with usual care visits found less children with high (1.2 vs. 2.6%) or increased risk (14.5 vs. 20.7%) than in visits with the SPARK ($p = 0.002$), but indicated that more help was needed. Contrary, no additional contacts were advised in 25% of the children labeled as high risk by the professionals in the care-as-usual group, while all high risk children visited with the SPARK received additional contacts.

Conclusions The SPARK, a validated structured interview, improves early detection of parenting and child-developmental problems in young children, compared to regular visits without an instrument. Structuring information gathering on concerns and care needs of parents gives professionals information beyond their professional viewpoint, and results in a joint decision that fits better with care needs of parents and risk level.

Background and aims

Early detection of parenting, health, psychosocial and developmental problems is in most countries an important part of preventive child and youth health care services (CHC) (1-6). In the Netherlands, early problem detection and assessing care needs of families is by law a part of the national standard set of tasks of the Dutch CHC (7, 8).

The CHC in the Netherlands invites all children from birth onwards to adolescence at a regular pre-determined scheme. During these check-ups development and growth are monitored, there is room for questions of parents and the CHC professional gives preventive advice. From professionals in CHC is expected that they assess care needs of parents, clarify problems experienced by parents, explain to parents what belongs to normal development and make a risk assessment for parenting and developmental problems, usually with the options 'at risk' and 'not at risk'. However, no guidelines are given how early detection of problems, assessment of care needs and risk assessment should be carried out.

To improve this practice, we developed and validated a structured interview that assesses care needs of parents of young children, resulting in a joint decision about any further care and in an assessment in three categories: low, increased or high risk for parenting and developmental problems. This instrument, called the Structured Problem Analysis of Raising Kids (SPARK) (9-11) uses both the experiences of the parents and the perspective of the CHC professional. Our previous research showed that the SPARK is suitable for the combined task of early problem detection and assessment of care needs of parents (9-11). To assess whether the SPARK has added value to care as usual, we set up a study comparing regular visits to the well-baby clinic with visits using the SPARK. We assumed that structured interviewing parents about parenting and child-development would result in better detection of children at risk for parenting and developmental problems compared to regular consults without structured interviewing. Furthermore, we describe the populations by care needs as expressed by parents and CHC professional, and parent-reported child development and parenting stress.

Methods

Study design

In daily practice of CHC we performed a non-blinded, nonrandomized trial comparing a visit to the well-baby clinic by parent and child with and without an instrument for early detection of problems in parenting and child-development.

We chose the age of 18 months as at that age children are in the transitional phase from baby to toddler and all children in the Netherlands are invited for a regular consult at the well-baby clinic. The main goals of this consult are to check the development of the child, assessment of risk for parenting and developmental problems, and plan further care if needed.

To minimize potential bias, all children who reached the age 18 months during the study period in the participating areas were eligible for participation. They were identified once

a month in the municipal population registries by an independent practice assistant of each participating CHC organization.

In the period of December 2006 to January 2008, 2.238 children from the whole province of Zeeland were invited for a visit to the well-baby clinic using the SPARK at age of 18 months as part of a randomized controlled trial comparing home visits versus well-baby clinics (12). Using the SPARK requires extra time, therefore a double consult (30') was planned. In the period of July 2007 to October 2008, 2.200 children from demographically comparable areas (see figure 1) were invited for a regular visit to the well-baby clinic at age of 18 months. These four areas were selected based on similarity (partly rural, partly urbanized, one CHC organization responsible for the whole area) and on willingness of the CHC organization to participate in the study without any reimbursement. Inclusion periods in both trial arms do not fully overlap due to the time needed to reach agreement on participation with enough CHC organizations to reach the required sample size in the control arm.

In both trial arms, parents received an information letter on the aim of the visit and the study together with the invitation. At the end of the visit to the well-baby clinic, the CHC nurse requested for informed consent (verbal + written) to use the information from the visit and subsequent questionnaires for scientific research. The order of the steps was cho-

Figure 1. Map of the Netherlands with Zeeland province (dashed) were invited for a visit to the child health centre with a structured interview for early detection of problems in parenting and development at age of 18 months and the area's (striped) were invited for a regular visit to the child health centre (i.e. without structured interview).



sen on purpose, as it may be uneasy for both parents and CHC nurse to talk about parents' concerns and care needed after informed consent has been denied. Blinding was not possible as this was a regular visit that requires active participation of both parents and CHC nurse. The Medical Ethical Review Committee of the University Medical Center Utrecht gave a positive advice for this study, including the consent procedure (protocol number 06-290/C) at October 31, 2006. The study was registered at the Netherlands Trial Register (<http://www.trialregister.nl>), NTR1413.

During the development study of the SPARK (9), all CHC nurses from Zeeland province were trained in using the SPARK, received a manual and got experienced. The CHC nurses in the 'care-as-usual' regions received a half-day training on the research protocol including administering data collection and received a manual.

Outcome measures

The primary outcome in this study is the difference in number of 18-month-old children with high or increased risk for parenting and developmental problems as assessed by the CHC nurse. Secondary outcomes are the differences in care needs as expressed by CHC professional, the percentage of parents and other children of the family attending, follow up actions, the scores of parent-reported questionnaires on child development and parenting stress and the time needed for the consult.

A consult with the SPARK started with a structured dialogue by the CHC professional with parent(s) about parental concerns and care needs on 16 subject areas, and aims at shared decision making between parent and CHC professional about any further care. Next to the joint decision about further care, the SPARK results in the overall risk assessment on problems in parenting and development of young children, preceded by a structured elaboration of all available information by the CHC professional.

The 16 topics of the SPARK are: infancy review (reviewing past issues and discussing any problems arising from the infant period that are still relevant); somatic health; motor development; language, speech and thought 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/preschool education; how the child spends its 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. 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 six months (Step 1). Parents are requested to assess the seriousness 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) counselling; 5) intensive help; 6) immediate intervention required. The CHC professional then makes the same assessment (Step 2). The information of steps 1-2 is recorded on a one-page form with a matrix structure: the first column includes all topics, followed by columns for each separate question: concerns / used support / support helped / current perceived need for support by parents / perceived need for support by nurse. After all the topics have been covered, the CHC nurse discusses with the parents the amount and content of care needed in the following months (Step 3), and notes this together with a description of the concern or problem on the second page, on which the possibilities for further care have been preprinted. Having done this, the CHC nurse ends the visit and subsequently makes an overall risk assessment on the third page, assigning the child a low, increased or high risk for parenting and developmental 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 this risk assessment. This structured elaboration includes the observation of several factors, preprinted on the third page: the interaction between parent(s) and child(ren); growth and development of the child; manifest problems (both in the child such as existing illness, and in the family such as major life events, history of psychiatric illness, financial problems etc.); and living environment (hygiene, housing, family composition).

A cross-sectional study with a 1.5-year follow-up showed that the SPARK is a feasible, valid and reliable instrument (11). The SPARK discriminated between children with a high, increased and low risk for parenting and developmental problems in a reliable way. The inter-rater reliability between trained nurses was good to excellent with intraclass correlations between 0.7 and 1.0 for all SPARK topics; with the exception of the topic 'parenting approach' (0.62). The overall risk assessment also had a very high intraclass correlation of 0.93 (11). This study showed that the SPARK was practicable and provided useful information which helped to decide, together with the parents, what care was needed in a family. The overall risk assessment of the SPARK was a strong predictor for future 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) and also for future confirmed reports to the Youth Care Agency (in Dutch: Bureau Jeugdzorg) 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]. The specificity and negative predictive value of both high and increased risk for a future report to ARCAN or Youth Care Agency were high (high risk: 0.97 and 0.99, increased risk: 0.80 and 0.99) (10).

In usual care, a consult consisted of asking for the main concerns of the parent, checking several relevant developmental steps, giving preventive advice suitable for the developmental phase of the child and the risk assessment for parenting and developmental problems. Data for this study were recorded by the CHC nurse on a preprinted form imme-

diately after the consult. To be able to compare regular visits with SPARK-visits, the form contained on one page the main outcome items from the SPARK-form: the perceived need for support and the overall risk assessment. For each of the 16 topics of the SPARK the CHC professional filled in the current perceived need for support, on the same six-point Likert scale as the SPARK uses: 1) no help needed; 2) information wanted; 3) personal advice; 4) counselling; 5) intensive help; 6) immediate intervention required. As the official length of the consult was 15-20 minutes, the CHC nurse may not be able to collect information on all topics. Therefore we added an extra answering option: 'no or not enough information available'. As stated before, the regular risk assessment has two options: at risk or not at risk. For the purpose of this trial, the same three categories as in the SPARK were used: low, increased or high risk for parenting and development problems. The additional page of the form contained demographic items and informed consent. Both forms included a decision on what to do next, and whether this could be done in the regular contacts or required additional contacts.

We collected additional information to describe and compare the study populations, independent of the CHC professional and the SPARK. All parents who gave informed consent were asked to fill in a set of self-reported questionnaires on child development and parenting stress. This set included a pre-stamped envelope addressed to the research team. The set of questionnaires was marked with the same unique anonymised identifier as the consultation form. As research team we did not have names and addresses of participating children; therefore no reminder could be sent. The set consisted of the following questionnaires: 1) Ages and Stages Questionnaire (ASQ) version 2, 18-month version (13, 14). The ASQ consists of 30 questions on 5 domains: communication, gross motor, fine motor, problem solving and personal social. The ASQ has three answering options: 'yes', 'sometimes', 'not yet'. Domains have a range of 0 to 60. 2) The Ages and Stages Questionnaire: Social Emotional (ASQ:SE, 18 month version) also has three answering options: 'most of the time', 'sometimes' and 'rarely or never'. Parents are asked to tick off a checkbox if the item in question is a concern (15). The ASQ:SE has a scoring range of 0 to 255 in the 18-month version. 3) The short validated Dutch version of the Parenting Stress Index (16), called 'Nijmeegse ouderlijke stress index – kort' (NOSIK) (17). The NOSIK consists of 25 items using a 6-point Likert scale ranging from 'do not agree at all' to 'do completely agree', with a scoring range of 25 to 150. The 18-month versions of both ASQ and ASQ:SE have been translated into the Dutch language using a double forward – once backward procedure. The (minor) differences have been resolved in cooperation with the developer of these questionnaires. Although these translations of the ASQ and ASQ:SE have not been validated, the ASQ and ASQ:SE have proven to be practicable and valid in other countries than the USA (18-20), including the Netherlands (48 month version (21)). The SPARK, the form for the care-as-usual region and the parent-reported questionnaires have been printed and scanned using Teleform®.

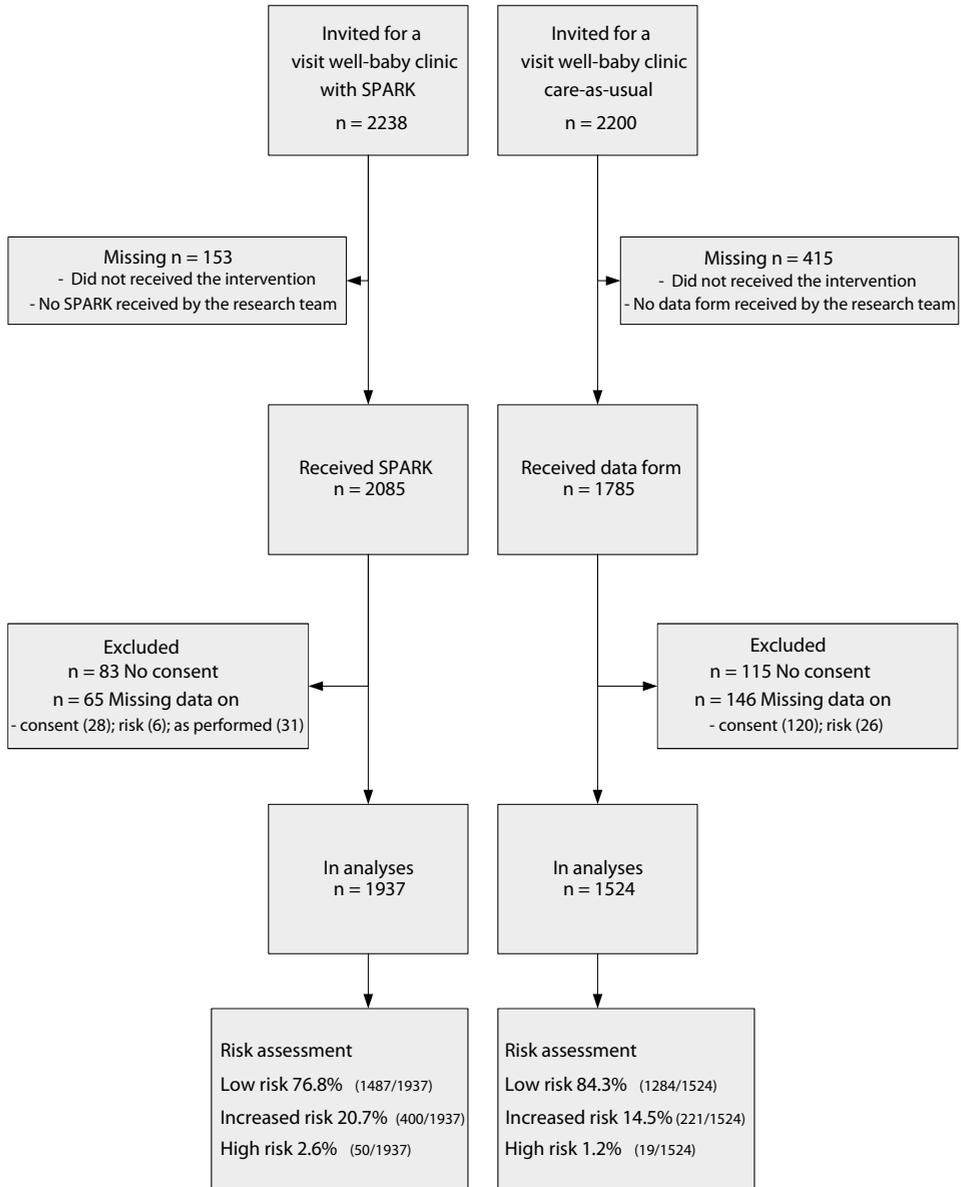
Sample size calculation and analysis

Based on the prevalence of high and increased risk for parenting and developmental problems in the developmental study of the SPARK (9), we used for sample size calculation a difference of 3% in high + increased risk between a visit to the well-baby clinic with and without an instrument for early detection of problems in parenting and child-development. To detect this 3% difference with an alpha of 0.05 and a power of 0.90 required 2006 children per group (22). Taking 10% non-response into account implied that for each group 2200 children needed to be invited.

Characteristics of the children and their family, needs assessment, attending, follow up actions and scores of the parent-reported questionnaires were analyzed using descriptive statistics. Differences in characteristics between the groups were assessed using Anova or Mann-Whitney U-test, depending on the variable. The difference in amount of children with high, increased and low risk between the two conditions was computed using ordinal regression analysis with a proportional odds model (23). This way, the cumulative response probabilities of the response categories are estimated. Due to the unequal distribution of the response categories, we chose for negative log-log as the most appropriate link function (lower categories more probable) instead of the better known logit link function, which is used for evenly distributed categories (24-26). The choice for negative log-log implies that no odds ratios can be obtained from the model (24-26). As no direct interpretation of the effect estimate is possible, we used the observed difference in frequencies for interpreting the difference between the trial arms. As randomization was done for the whole population before requesting consent, we did not have outcome data in the group of non-responders. Therefore, we could not perform a true intention-to-treat (ITT) analysis (27) but did carry out an analysis 'as allocated', without non-responders and no-consent group. This equals to an ITT analysis on the children for whom we obtained informed consent.

We performed adjustment for possible selection bias by using a propensity score as a covariate in the ordinal regression analysis. The propensity score was obtained by doing logistic regression analysis with study group membership as dependent variable, and demographic characteristics as independent variables (type of family, age of parents, educational level of the parents, and work status of the parents). The selection of variables was based on the differences found between risk groups in our development study (9). These variables were checked for balance after computing the propensity score. Scores on parent-reported questionnaires were compared using linear regression, using the propensity score as a covariate. Data-analysis was done using SPSS version 20. A *p*-value below 0.05 was considered significant.

Figure 2. Flow diagram of a comparison of visits to the child health centre with or without a structured screenings method for early detection of problems in parenting and development at age of 18 months.



Results

During the study period 2.238 children from the whole province of Zeeland were invited for a visit to the well-baby clinic using the SPARK at age of 18 months and 2.200 children from demographically comparable areas were invited for a regular visit to the well-baby clinic at age of 18 months (see the flow chart, figure 2). There were no data available for 568 children (12.8%: 568/4438; visit with SPARK 3.4%: 153/4438 versus visit care as usual 9.4%: 415/4438). This was partly because parents were not or could not be invited for the regular check-up at the age of 18 months (e.g. due to an omission by the CHC nurse, or parents and children did not reside on the address from the municipal population registry), and partly because no SPARK or care-as-usual form was received by the research team. For another 211 children, incomplete data was available i.e. consent or risk was not filled in by the CHC nurse (4.8%: 211/4438; visit with SPARK 1.5%: 65/4438 versus visit care as usual 3.3%: 146/4438). No consent was given for 198 children (4.5%: 198/4438; visit with SPARK 1.9%: 83/4438 versus visit care as usual 2.6%: 115/4438). Analysis was done on 3461 children, see the flow chart in figure 2.

Population characteristics are presented in table 1 per 'visit' group. Most characteristics were similar between groups, except 'place in family order', 'education' and 'employment'. Response on the parent-reported questionnaires was about two-thirds: in the visit group 'with SPARK' 66.0% (1297/1937) of the parents returned the ASQ and the ASQ:SE while 64.4% (981/1524) of the parents in the visit group 'care as usual' returned these questionnaires. The response of the NOSIK was 62.4% (1208/1937) versus 60.0% (915/1524). The scores of the parent reported questionnaires were similar between the groups, with the exception of a very small but significant difference in ASQ-fine motor (group with SPARK 1.34 points higher on a 0-60 scoring range, $p = 0.001$). Mean scores and % 'need further evaluation' for the whole study group are presented in table 2.

The mother was most often present during the visit (well-baby clinic with SPARK 95.0% versus well-baby clinic 'care-as-usual' 92.6%); fathers were less often present (well-baby clinic with SPARK 15.5% versus well-baby clinic 'care-as-usual' 20.6%). Both parents were present during 11.4% of the well-baby clinic visits with SPARK and during 15.0% of the well-baby clinic visits 'care-as-usual'. Other children from the same family were present during 22.8% of the well-baby clinic visits with SPARK versus 19.0% of the well-baby clinic visits 'care-as-usual'.

Completing the SPARK took on average 25.2 minutes (sd 8 min.) at the well-baby clinic. The total duration of the visit in the care-as-usual region was 20.7 minutes (sd 6.9 min.). The second step of administering the SPARK consists of asking both the parents and the professional for the current perceived need for support. Differences between the assessments of parent and professional were most frequent in the categories 'information wanted', 'personal advice' and 'counseling', and not in the more serious categories 'intensive help' and 'immediate intervention required' (see table 3; column 1–2). In column 3 and 4 of this table, the needs assessment by the professional in the care-as-usual group were

presented. Professionals in the 'care-as-usual' group scored more need for support than in the 'SPARK'-group, both in the lower categories and in the more serious categories. In this 'care-as-usual' group the CHC professional had the option to answer 'no or not enough information available'. This was most applicable on the topics 'any topic forgotten', 'language use of parents', 'concerns communicated by others' and 'family issues' (see table 3; column 5).

The third step of the SPARK concerns an analysis and a decision on what to do next. Most of the follow-up actions can be done by the CHC professionals themselves within their regular contacts (visit well-baby clinic with SPARK 77.9%), while for 22.0% of the children, additional contacts were required. The CHC nurses in the 'care-as-usual' group registered that 91.1% of the follow-up actions can be done within their regular contacts, while for 8.1% of the children, additional contacts were required. Table 4 shows the follow-up actions per risk group.

Finally, the professional assigns an overall risk assessment. The results of this risk assessment are shown in figure 2. The probability of having a high, increased and low risk was significantly different between the two locations ($p = 0.002$). For high risk, the observed (unadjusted) difference was 1.4% (visit with SPARK 2.6%, regular visit 1.2%). The observed difference for increased risk was 6.2% (visit with SPARK 20.7%, regular visit 14.5%).

Table 1. Population characteristics per 'visit' group.

Child characteristics (percentages)	Visit well-baby clinic with SPARK n = 1937	Visit well-baby clinic 'care as usual' n = 1524	p-value*
Male / female	53.1 / 46.9	54.3/45.7	0.5
Place in family order			<0.001
First child	40.2	47.4	
Second child	37.3	38.0	
Third child	14.3	10.1	
Fourth or younger child	8.2 (max 15 children)	4.5 (max 11 children)	
Family characteristics (percentages)			0.2
2-parent household	93.0	94.1	
1-parent household	3.0	2.9	
Shared household	2.2	2.4	
Other (foster-family / adoption / divorcement / grandparents)	1.8	0.6	
Parent characteristics (percentages)			
Age mother (mean in year, SD)	31.64 (SD 4.9)	32.69 (SD 4.7)	0.4
Mother age < 20 yr by birth of this toddler	1.5 (n = 30)	1.3 (n = 20)	
Age father (mean in year, SD)	34.38 (SD 5.5)	35.46 (SD 5.5)	0.9
Father age < 20 yr by birth of this toddler	0.7 (n = 13)	0.5 (n = 8)	
Ethnicity: non-Dutch mother	7.7	7.4	
Ethnicity: non-Dutch father	7.4	6.1	
Language: non-Dutch used at home by mother	8.3	6.3	0.3
Language: non-Dutch used at home by father	7.1	5.5	0.06
Education			0.004 mother <0.001 father
Low education	20.7 mother (including 2.4 very low) 23.6 father (including 2.4 very low)	19.9 mother (including 1.9 very low) 21.1 father (including 2.0 very low)	
Intermediate education	53.9 mother 49.5 father	49.2 mother 45.1 father	
High education	25.4 mother 26.9 father	30.9 mother 33.8 father	
Employment			<0.001 mother <0.001 father
Employed	67.3 mother 94.6 father	75.7 mother 97.3 father	
Unemployed	0.7 mother 1.0 father	0.6 mother 0.7 father	
Unemployable/unable to work	0.3 mother 0.6 father	0.3 mother 0.4 father	
Housewife / house husband	27.7 mother 0.6 father	21.1 mother 0.1 father	

*using Kruskal-Wallis test, with exception of age: using ANOVA.

Table 2. Scores of the self report questionnaires for the whole study group.

	Mean score (SD)	Need further evaluation in %
ASQ communication	40.8 (14.0)	2.0
ASQ gross motor	51.7 (12.4)	9.1
ASQ fine motor	52.0 (9.4)	5.0
ASQ problem solving	43.8 (10.9)	4.9
ASQ personal social	48.5 (9.0)	2.3
ASQ SE	27.5 (15.4)	5.8
	Score in %	
NOSIK: very low (possibly need further evaluation)	-	6.0
NOSIK: low	17.4	-
NOSIK: below average	35.0	-
NOSIK: average	31.6	-
NOSIK: above average	6.1	-
NOSIK: high (need further evaluation)	-	2.9
NOSIK: very high (need further evaluation)	-	1.0

Table 3. Scores per domain on needs assessment per ‘visit’ group; with SPARK (n = 1937) and without SPARK (n = 1524).

Domains: (percentages)	Visit well-baby clinic with SPARK: Perceived need of support assessment* by parents and professional**		Visit well-baby clinic ‘care-as-usual’: Perceived need of support assessment* by professional		
	information wanted / personal advice / counseling	intensive help / immediate intervention required	Information wanted / personal advice / counseling	intensive help / immediate intervention required	No or not enough information available
Infancy review	6.1 / 7.8	0.8 / 0.7	35.4	1.8	4.9
Health and development					
Somatic health	12.9 / 18.7	0.6 / 0.7	41.3	1.8	0.3
Motor development	11.0 / 20.4	0.2 / 0.4	35.9	1.5	0.3
Language, speech and cognitive development	20.7 / 38.8	0.2 / 0.3	43.4	0.7	0.6
Language use of parents	3.3 / 7.3	0.0 / 0.1	16.0	0.4	14.2
Emotional development	23.1 / 37.8	0.3 / 0.3	38.5	0.3	0.9
Child-parent interaction					
Contact between child and others	8.6 / 15.7	0.1 / 0.0	33.0	0.3	1.2
Child behavior	28.4 / 45.1	0.6 / 0.9	50.5	0.8	0.3
Parenting approach	23.3 / 36.9	0.6 / 0.9	52.0	1.3	0.7
Developmental stimulation	11.9 / 24.3	0.1 / 0.1	19.3	0.5	6.8
Time spending	6.5 / 12.8	0.2 / 0.2	16.2	0.1	4.3
Family and environment					
Living environment	3.0 / 6.1	0.5 / 0.5	10.9	0.7	6.7
Social contacts	3.1 / 5.9	0.3 / 0.3	12.7	0.1	8.0
Day care for child	2.5 / 5.2	0.2 / 0.2	11.6	0.5	5.7
Concerns communicated by others	2.8 / 5.2	0.2 / 0.4	12.2	1.4	14.1
Family issues	8.4 / 14.5	1.8 / 1.5	14.0	1.3	13.2
Was any topic forgotten?	3.6 / 4.5	0.1 / 0.2	5.5	0.6	29.9

*The 6-point assessments of professional were dichotomized for readability; category ‘no help needed’ was omitted.

** parents assessment/professional assessment

Table 4. Follow-up actions per risk group.*

	Less than regular contacts		Within regular contacts		Additional contacts	
High risk	0%	/ 5.6%	0%	/ 22.2%	100%	/ 72.2%
Increased risk	0%	/ 0.9%	34.1%	/ 56.8%	65.9%	/ 42.3%
Low risk	0.1%	/ 0.8%	92.7%	/ 98%	7.2%	/ 1.2%

*visit well-baby clinic with SPARK / visit well-baby clinic 'care-as-usual'

Discussion

This study compared regular visits to the well-baby clinic with visits using the SPARK to assess whether the SPARK has added value in preventive child health care. We found that structured interviewing parents about their concerns and care needs on parenting and child-developmental topics resulted in finding more children at risk, especially children with high risk, and a better match between risk and suggested further care. The mismatch in usual care is represented by 1) a quarter of the high risk children not being offered additional follow up actions, and 2) by a higher perceived need for support accompanied by fewer children at increased or high risk compared to SPARK-assisted visits.

The SPARK improves the regular consultation at 18 months in two ways: structuring the information gathering while explicitly asking for parental concerns and care needs, and structuring the decision making on follow-up actions and risk assessment. From the literature it is known that structuring both information gathering and decision making leads to better results. Recently, both Bosker et al (28) and Kwaadsteniet et al (29) confirmed that structuring risk assessments and decision processes improves agreement between professionals on risks, needs and decisions. In preventive child health care, it is also important to include concerns of parents in the risk assessment and decision making on further care (9, 30). Reijneveld et al stated that "parents' concerns about children are highly prevalent but often not confirmed by child doctors and nurses" (31). Improving risk assessments and decision processes in preventive child health care is possible according to the findings by Vogels (32): using validated instruments improves identification of psychosocial problems among young children, and the findings by Theunissen (33): systematic working reduces the variation between CHC professionals in the proportion of children identified as having a problem. A valid instrument should also be reliable when used in daily practice. We showed that the SPARK is both reliable and valid (9, 11).

An important question is whether finding more risk is better. Our previous research indicated that the overall risk assessment of the SPARK was a strong predictor of future reports on child abuse and neglect or serious parenting problems, and that the high risk group is indeed more severe than the other groups (10). Prevention by early detection and intervention is a cost-effective strategy (34-36). By using the SPARK chances for early detection, empowerment of parents and joint decision on what to do next with parents

will be improved for a considerable number of children with increased and high risk of negative developmental outcomes.

This study has several limitations. First, there was more non-response in the usual care group. This is only a limitation from an analysis viewpoint: it also shows that using a structured instrument improves response. Second, because of the non-randomized design of this study, selection bias may distort the results. Therefore we used propensity score adjustment. However, this does take only into account measured confounding and not possible unmeasured confounding (37). We collected additional information to compare the study populations on child development and parental stress, independent of CHC professional, visit and SPARK, using parent-completed, validated questionnaires. Analysis of these questionnaires indicated that the propensity score adjustment indeed resulted in balanced populations. Third, we did not assess long term outcomes; nurses reported their advise for further care, but we did not record which care has been delivered. Further study to assess the long-term outcomes of the SPARK, both on health outcomes and costs, is required.

Conclusions

CHC professionals detect more young children with high and increased risk for parenting and child-developmental problems with a structured instrument for early detection in comparison to regular care without an instrument. The SPARK is a validated interview between parent(s) and CHC professional about parental concerns. Structuring information gathering on concerns and care needs of parents, gives professionals information beyond their professional viewpoint, and results in a joint decision that fits better with care needs of parents. Further research is needed whether the extra time needed for the SPARK is cost-effective, and whether using the SPARK results in better outcomes, such as service engagement, child development and social-emotional outcomes.

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Chapter 7

General discussion

Aim and research questions

The aim of this study was to improve early detection of parenting and/or psychological, somatic and social development problems in toddlers. This aim originated from the drive to innovate and professionalise daily practice within preventive child health care (CHC). Also, the wish to provide the most appropriate care for the child and parent played an important role: within the life course perspective (1-3), transition moments such as from infant to toddler are pivotal moments in reconsidering which care is needed. Parents, as the most responsible and influential persons for the child, should play a central role in such a process. Improving early detection will be helpful to CHC professionals in carrying out their tasks: 1. to strengthen parental capacity, 2. to pay attention to normalization based on knowledge of normal development, 3. to educate parents and offer short-term support so that they are able to care for their families, and no further specialized care is needed, and 4. to improve identification, referral, and engagement with parents (4). To be useful in the daily practice of the preventive CHC, we defined several requirements for an instrument for assessing parenting and/or psychological, somatic and social development problems : 1. a broad scope that includes the child, its family and the child rearing environment; 2. a systematic approach of querying concerns and care needs; 3. interaction between the parent(s) and professional; 4. information about the true nature of experienced problems; 5. agreement between parent and professional about the aim and content of any subsequent care; and finally 6. validity, reliability, and feasibility in daily practice. To this end, we developed and tested a broad-scope structured interview that assesses parents' concerns and their need for support, using both the perspectives of the parent(s) and the experience of the child health care nurse, that is, the Structured Problem Analysis of Raising Kids (SPARK). The general research questions of this thesis were the following:

1. What are the content, structure, and psychometric properties of the SPARK for the early detection of parenting and/or developmental problems in toddlers?
2. What is the added value of a home visit and the SPARK compared to a visit to the well-baby clinic for the early detection of parenting and/or developmental problems in toddlers?

To answer these two general research questions, we set up a series of studies: Part A (Chapter 2, 3 and 4) addresses the first question, while Part B (Chapter 5 and 6) focusses on the second question.

Interpretations of main findings

The SPARK is a feasible, reliable and valid instrument for the detection of parenting and developmental problems in young children (Chapters 2, 3 and 4).

We developed the SPARK by drawing closely on both research and practice, and tested its psychometric characteristics with data from all toddlers living in Zeeland, a province of the Netherlands. We have assessed the SPARK in daily practice on feasibility (Chapter 2),

inter-rater reliability, convergent validity, discriminative validity, the usability of both parents and CHC professionals (Chapter 3), and predictive value (Chapter 4). The SPARK is based on an existing instrument for assessing the needs of parents for parenting support. This instrument, the *Vragenlijst Onvervulde Behoeften aan Opvoedingsondersteuning* (5-7) underwent several substantive modifications to make it suitable for scientific research in daily practice. Furthermore, we aimed at a different age group than the original instrument, and included a set of topics that reflect the broad scope of CHC in the Netherlands. We added (a) questions about the current need for support; (b) structured space for detailing the nature of both problems and subsequent actions agreed upon with the parent(s); and (c) a new three-level risk assessment, preceded by a structured elaboration of factors influencing the risk assessment. Due to the interactive process of repeated trialing by nurses, and subsequently adapting the instrument based on their comments and experiences, we succeeded in developing an instrument that is both feasible in daily practice and suitable for scientific research. Because of the large numbers of changes made to the original instrument, we decided to give the adapted instrument a new name, with the same acronym (and roughly the same meaning) in both English and Dutch: ‘Structured Problem Analysis of Raising Kids’ and ‘Signaleren van Problemen en Analyse van Risico bij (opvoeden en ontwikkeling van) Kinderen’.

Validity and reliability

Almost all parents have questions concerning child raising or the development of their child, and need support at some point in their parenting career, as noted in other studies (8, 9). The survey study in Chapter 2 shows that a number of these questions, if discussed appropriately, can be detected by the CHC professional. The SPARK provides relevant information about problems experienced and care needs, which can be addressed immediately. Both agreement and disagreement between parents’ scores and those of professionals are useful for deciding which follow-up actions to take. We achieved a very high response rate of 97.8%. This is somewhat higher than other studies in preventive CHC in the Netherlands (10, 11), and much higher than others (12-14). In our studies, the overall risk assessment of the SPARK showed that 2.6–3.7% of the children were labelled by the CHC professional as high risk, and 16.5–20.7% as increased risk of parenting and developmental problems.

The inter-rater reliability (studied in Chapter 3) was very good to excellent, especially for the overall risk assessment and the physical domains (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). The SPARK proved itself to be discriminative, by distinguishing between areas with a different socio-economic status-levels (SES) and between postal codes (representing both SES and urbanization). There were large and significant differences between so-called “extreme groups”: children already reported (before the age of 18 months) to the child protective services versus children with only positive scores on a set of parent-

reported questionnaires on child development and parenting stress. The only psychometric property that was below expectations was that of convergent validity. Correlations of SPARK-domains with related domains from self-reported questionnaires were significant and in the expected pattern, but very low (all correlations ≤ 0.3). This lack of convergence is probably influenced by several aspects. First, the content and the method of questioning differ between the SPARK and the self-report questionnaires. The self-report questionnaires are not a perfect criterion, as no criterion instrument (“gold standard”) exist for early detection of parenting and/or developmental problems. Second, a non-heterogeneous study population, caused by (a) the fact that the majority of the children had no problems, and (b) the group that did not return the self-report questionnaires included a large portion of the children with high risk on the SPARK. 33.1% of the self-report questionnaires were not returned, covering 62.5% of the children with a high-risk label according to the SPARK ($p < 0.001$). This is a clear indication of selection bias when self-reported questionnaires are used as detection- or selection-instrument, as in other studies (12-14). Users were satisfied with the SPARK and identified some topics for improvement that were used to adapt the SPARK.

Predicting reports to ARCAN/YCA¹

The overall risk assessment of the SPARK (described in Chapter 4) is the strongest predictor for future reports to the Advice and Reporting Centers for Child Abuse and Neglect (ARCAN) and Youth Care Agency (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 (static) risk factors and an unemployed father remained as significant predictors in multivariate analysis. The finding that all known risk factors for child maltreatment were significantly related to ARCAN/YCA reports in univariate analysis—as expected—adds to the credibility of the results. The reported groups differed significantly from the children without a report with regard to family characteristics, but not with regard to child characteristics. This clarifies that the SPARK not only looks at the development of the child, but—importantly—also at the situation in which a child lives. What we do not know is whether reported children were reported because of the risk signal from the SPARK, or independent from the signal, which would imply that subsequent actions were not effective enough. On the other hand, not all children with a high-risk label were reported to ARCAN/YCA. Reports to the YCA are voluntary, that is, parents already understand that they need help. With the interactive, solution-oriented approach of the SPARK parents and professionals works towards this understanding and request for help from the parent himself.

¹ From 1 October 2014 the Youth Care Agency Zeeland called ‘Interventie’. From 1 January 2015 the Advice and Reporting Centers for Child Abuse and Neglect and the Support Centres for Domestic Violence are combined into the AMHK, called ‘Safe Home’.

Improving risk assessments

Improving risk assessments and decision processes in preventive child health care is possible according to the findings by Vogels (15): Using validated instruments improves identification of psychosocial problems among young children; as well as the findings by Theunissen (14): Standardizing practices reduces the variation between CHC professionals regarding the proportion of children identified as at risk. A valid instrument should also be reliable when used in daily practice. This chapter showed that the SPARK is both reliable and valid for the detection of parenting and developmental problems in young children (16, 17).

A home visit improves early detection of parenting and/or developmental problems in young children, compared with a visit to the well-baby clinic (Chapter 5).

To compare both locations we used the difference in the distribution of children with high, increased and low risk of parenting and/or developmental problems as assessed by the SPARK as the primary outcome. Secondary outcomes included the percentage of parents attending, parents' concerns, needs assessment by parents and CHC professionals, and user experience. We expected the largest difference in the increased risk group, based on the assumption that high-risk children were already known to the CHC professional. Contrary to this expectation, we found more children with high risk in the home visit group, and more children with increased risk in the clinic visit group. At home, the CHC nurse identified significantly more children with a high risk compared to a clinic visit (3.7% vs. 2.6%), and fewer children with an increased risk (19.1% vs. 20.7%; overall $p = 0.028$). From our study discussed in Chapter 4, we know that the high-risk group is an important group with multiple problems, and that it is more problematic than the other groups, as indicated by a high number of confirmed child maltreatment reports (18).

Response rate

In all studies included in this thesis, the response rate with the SPARK is above 90%, in contrast with a response rate of 66.9% for the self-report lists. For a scientific study, this is still a high response rate. However, this was a selective non-response: about two thirds of the children with a high-risk score on the SPARK were part of the one third that did not return the self-report questionnaires. This not only shows the decrease in reach by using only surveys, but also that one misses precisely the group that is the main target. The time and energy invested by the CHC in parents, through the execution of the SPARK, can also have a positive impact on response rates of those CHC organisations suffering from declining response rates after infancy.

Usability

Both parents and CHC nurses expressed more frequent need for support, and reported significantly better experiences at home. The usability shows that, according to nurses,

parents were more active during the interview at home, that nurses were more satisfied with home visits, and that they felt less rushed than during the interview at the clinic. Parents also reported a higher satisfaction during the home visit compared to the well-baby clinic. Our findings support the assumed advantages of a home visit. More and better information can be derived on family situation and housing conditions, interaction between child and parent(s), more parents are reached, and parents and children are more at ease in their own family environment. In addition, parents with simple questions seemed to benefit from a home visit, as they reported more concerns at home and asked for more information or advice. This way, the CHC professional contributes with positive confirmation and information about normal development, to the optimal development and behavior of children, and parental capacity of parents.

The SPARK has added value to care as usual (Chapter 6).

After showing that the SPARK is a reliable instrument to use in daily practice, and that it is valid for the detection of parenting and developmental problems in young children, we also need to know if the SPARK provides added value to care as usual. This was tested with a non-randomized comparison of usual care (regular visits to the clinic) and a visit to the clinic with the SPARK. We found that using the SPARK resulted in finding more children at risk—especially children with high risk—and a better match between risk and suggested further care. Professionals in usual care visits found fewer children with high (1.2% vs. 2.6%) or increased risk (14.5% vs. 20.7%) than in visits with the SPARK ($p = 0.002$). The mismatch in usual care is the result of professionals in the “care-as-usual” group scoring more need for support than in the SPARK group, but without offering any additional follow-up actions to a quarter of the high-risk children identified in the “care-as-usual” group. This mismatch in regular care underlines the added value of the structured approach of the SPARK.

General methodological considerations.

Specific methodological considerations have been discussed for the studies described in this thesis. There are also some general methodological issues that may have influenced our results. They are described in the following section.

As no criterion instrument (“gold standard”) exists for the early detection of parenting and/or developmental problems, criterion validity could not be assessed. Therefore, we have assessed the validity of the SPARK in multiple ways: convergent validity, discriminative validity, predictive value of the SPARK for reports on high-impact parenting problems and child abuse and neglect, and the usability in both parents and CHC professionals.

While developing the SPARK, we had to choose how to measure risk. We chose for a three-level risk assessment of low, increased and high risk. At that moment, assessing risk by CHCH nurses was done in a dichotomous way, using OK – not OK (in Dutch: “pluis – niet pluis”) as categories. Talking about this dichotomous risk assessment with CHC nurses showed that this assessment was not standardized and mostly based on clinical experi-

ence and gut feeling. Also, nurses wanted to be very sure before labeling a child as “niet pluis”. Therefore, we opted for adding a middle category. There was discussion whether the lowest risk category should be called “low risk” or “no risk”. The results of the ARCAN study reported in chapter 4 clearly shows that “no risk” does not exist, as one quarter of the children reported to ARCAN in the 1½ year after the visit with the SPARK were in the category “low risk”.

Next, we had to define this new three-level risk assessment. Instead of prescribing how a nurse should fill in the risk assessment (for example, based on the problem assessment in the first part of the SPARK), we chose a different approach. We decided to leave the choice for low/increased/high risk to the CHC nurse, and added support to help choosing. This support comprised a definition of each category, and a structured elaboration of factors influencing the risk assessment in a positive or negative way. These factors consist of observation of the interaction between parent and child, growth, developmental status, the environment, and manifest problems. We intend to study what information in the SPARK is related to the risk assessment, with the goal of underpinning assessment of risk for parenting and developmental problems by CHC nurses.

To answer the second research question, in Part B of this study: ‘what is the added value of a home visit and the newly developed instrument compared to a visit to the well-baby clinic for the early detection of parenting and/or developmental problems in toddlers?’, we set up a three-arm trial, with 2200 children per arm. It was not possible to randomize the third arm of the trial, due to financial restrictions on the grant for doing home visits. We compared the non-randomized arm (visit to the well-baby clinic, care-as-usual) with the randomized arm (visit to the well-baby clinic with SPARK), and performed adjustment for possible selection bias by using a propensity score as a covariate in the ordinal regression analysis. This resulted in comparable study populations and a smaller—but still significant—difference in the outcome.

During the setup of the trial described in Chapters 4 and 5, we planned to perform logistic regression analysis. During the analysis phase, however, the method of ordinal regression appeared to be a better alternative, due to the ordinal nature of the three-level risk assessment. The ordinal regression posed some new challenges: due to the unequal distribution of the risk levels, the standard logit link function could not be used. We had to use the negative log-log link function (lower categories more probable), which implies that no odds ratios can be obtained from the model. As no direct interpretation of the effect estimate is possible, we used the observed (‘raw’) difference in frequencies to interpret the difference between the trial arms.

We used an unusual randomization and informed consent procedure. Instead of randomizing *after* informed consent—the usual procedure in trials—we randomized all children identified each month in the municipal population registry. After randomization—all children were entered in a secured online randomization module by an independent practice assistant—the outcome of the randomization (“allocation”) was sent to both the nurse re-

sponsible for that child and to the research team. As randomization was performed for the whole population before requesting consent, we did not have outcome data in the group of non-responders. Therefore, we could not perform a so-called intention-to-treat analysis (i.e. an analysis on all randomized children) (19) but did carry out an analysis “as allocated”, without non-responders and no-consent group. This is equivalent to an intention-to-treat analysis on the children for whom we obtained informed consent. Deviations from randomization had a marked impact on our results. If CHC nurses had a suspicion that a parent of a probably high-risk child would not show up at the clinic, they performed a home visit. The CHC nurses considered seeing a probably high-risk child more important than carrying out the study as instructed. This means that an analysis on how the visits were actually done (“as performed”) showed a much larger difference in risk assessment between home visits and visits to the well-baby clinic then described in Chapter 5. This reflects better how nurses work in daily practice. However, such an “as performed” analysis was not presented, as this does not fit with the intention-to-treat principle.

Although the province of Zeeland resembles a large part of the Netherlands, it may not be representative of some highly urbanized areas elsewhere in the Netherlands. The percentage of families with a single-parent household, non-western families, parent(s) with a low education, unemployed parent(s) and younger aged mother from our research population in comparison with national data from Statistics Netherlands gives an indication of the external validity of our results. Most young children in Zeeland grow up in favorable conditions. Zeeland has a relatively low-educated population, but compared with the rest of the Netherlands, there are few non-western families, there is a relatively low unemployment, low poverty rates and fewer single-parent families (20, 21). Assuming that these well-known risk factors are associated with the presence of more parenting and developmental problems (as shown in the literature), implies that the difference in more highly urbanized areas between care-as-usual and using the SPARK may be even larger than the results found in Zeeland.

Implications and recommendations for policy and practice.

With the use of the SPARK, early detection of parenting and developmental problems is improved compared with care-as-usual. In addition, the psychometric properties of the SPARK show that variation in detection and risk assessment between CHC professionals are reduced through the use of a standardized instrument: they arrive at the same conclusion, when given the same information. Working with SPARK requires a different method by the CHC nurse. The structured and analytical method of interviewing requires first discussing the complete range of topics. Nurses find that hard to do – they have to suppress an urge to suggest solutions as soon as a problem is presented. Only after reviewing all the topics, solutions are discussed, together with the parent. This results in a more coherent advice from the CHC nurse, as shown by the following example. On the topic ‘child behavior’ a mother tells that they encounter problems with the sleeping

behavior of her child. The nurse requests more information to understand the type and nature of the sleeping problem and has in her mind methods to address this sleeping problem. However, she holds on to the problem and indicates this comes back later, and first proceeds, according to the method of SPARK, to interchange all topics. In discussing the penultimate topic 'family matters' reveals that the relationship between the parents lately is under pressure, wherein mother insists that they only quarrel if their child is already in bed. The last additional information results in a different approach that would be advised upon hearing the sleeping problem alone. The structure of the SPARK form supports this approach, including the questions dealing with more sensitive topics. This results in a standardized, broader and more objective look at the family, often giving useful or even essential information that the nurse not would have known otherwise. The structure of the SPARK form also proves useful for personal reflection and coaching of professionals. Comments from nurses working with the SPARK indicate that the structure of the SPARK is also applicable to other contacts. Nurses reported that they also used the questioning structure of the SPARK at other ages when they needed an in-depth assessment of a family or situation. This suggests it would be worthwhile to develop versions of the SPARK for other ages, and probably also for other professionals who require in-depth assessment in dialogue with the parent/client/patient.

Home visits throughout the population are a well-known tradition within the preventive CHC community. In discussions with management of CHC organizations regarding implementation of the SPARK, it is often suggested that home visits only be carried out on indication, in order to keep costs down. It is questionable whether the high response rates of the studies described in this thesis will be achieved, as home-visit programs on indication encounter barriers to coming into peoples' houses, as has been shown in the review by Peacock (22). Another option that is often suggested is to carry out the SPARK only with a selected group of children, for example first-born children. However, our results described in Chapters 2 and 3 indicate that this form of pre-selection is not a valid assumption: problems occur just as often among second and third children as among first-born children. The problem is this: how to do the pre-selection? Within the CHC it is becoming increasingly more common to select through self-reported questionnaires. Our results described in Chapter 3 showed that the group that did not return the self-reported questionnaires included a large portion of the children with high risk on the SPARK. This selection bias threatens the usefulness of self-reported questionnaires for both research and clinical practice. We do not argue for abandonment of self-reported questionnaires, but for conscious use of questionnaires. It is important what purpose they serve. If they are used for selecting at-risk groups (which is often the case), our study shows that you will miss most of the children you were looking for. However, if self-reported questionnaires are used for monitoring (see Directions for future research) they are potentially useful. In our opinion, the SPARK should be done with all children, informing which care trajectory is most suited for each child. This can be done by developing care pathways (see *Directions for future research*).

Cost before benefits

When the SPARK is used during a home visit, we see an additional value for the high-risk group. Our findings show that this really is a group that requires extra care (in time). However, a home visit is a method that requires more time from both professionals and parents, and is therefore more expensive. The question that then arises is, how much are the benefits worth?

According to CHC practice in Zeeland, it has been calculated that doing a home visit with the SPARK requires an additional investment of €50 per child compared to a regular visit to the well-baby clinic (60 – 20 minutes = 40 minutes x hourly wage CHC nurse = €50). However, 2.5% more children with high risk are identified and follow-up actions are used that will fit with the care needs of parents better. This means for an average Dutch town with 50.000 inhabitants of whom 12.000 in the age of 0-18 years, of which 667 are estimated to be 18 months old, this would result in an additional annual investment of (667 x €50) €33.350. This extra expenditure would identify 17 additional children with high risk, that is, €1.962 per detected child. From the study on the predictive value of the SPARK, it is clear that this high-risk group would benefit strongly from early detection. Failure of a municipality to invest in early detection at 18 months could lead to the at-risk children getting into trouble later in life, resulting in high costs to society, both financially and qualitatively. The amount of these costs are difficult to estimate and were not a research questions in this study. The hypothesis to be tested in an economic study is: are they above the extra expenditure of €1.962.

Different theoretical models suggest that investing in early detection at an early age means more value for money. Carneiro and Heckman's model (23) shows that an investment of €50 at the age of 18 months, for example, results in a higher value for money than the same investment at school age or after school age. This means the longer one waits to invest, the less efficient the investment is. In the National Health Institute's model (24), it is clear how much money can be saved through detection in the preclinical phase (i.e. by detecting the process of accumulating risk factors) or through prevention after the occurrence of the first symptoms, compared with curative treatment. This means the longer one waits, the more expensive treatment becomes. Curative treatment is expensive (25). The recent transition of youth care may offer municipalities an incentive for investments in early detection, as this may result in lower expenses for curative treatment. The dialogic, solution-oriented approach and joint decision process of the SPARK may prevent children coming into care at ARCAN or YCA by intervening in an early stage of an evolving problem. It also may result in children and their parents earlier ask for voluntary help from the YCA, (before the problem becomes a crisis). Which – besides preventing expensive care – is better for child and parent. The SPARK offers policy makers a chance to improve the quality of life of their citizens: directly by offering care suited to the needs of citizens, and indirectly by aggregation of the individual SPARK data to collective data. This can give the policy makers a better understanding of the health needs of young parents in their community.

The trend to look increasingly earlier with more focus on early detection, also has a risk: the earlier one looks, the more difficult it is to predict. This has the possibility that children and families are wrongly classified as problematic. We wonder whether one can talk about false positives if you take the experience and concerns of the parent as a starting point, as in the SPARK. False negatives are possibly “care averse parents”. One might wonder if someone really does not want help and there is no danger for the child: what would be the effect of help when given? Additionally, nurses with experience with the SPARK ensure that the domain ‘concerns communicated by others’ provides clear guidance to discuss their own concerns as a professional or to discuss signals from other people with the parents. With often surprising openings from these until then care averse parents. There may also be false positive cases: we encountered one mother who voiced serious concerns about the health and development of the child, while the nurse did not see anything worrisome. Further contacts with other care providers (with approval of the mother) revealed a case of Munchhausen by proxy (also known as Pediatric Condition Falsification), a potentially lethal, and frequently misunderstood form of child abuse (26). Although this is a rare finding, it shows that the combination of concerns of parents and professional experience are both essential elements of risk assessment in young children.

This trend of early detection also poses a threat to the original strength of the Dutch CHC, that is, the low threshold and the wide reach which is necessary to identify. Consider statements to the press, for example, where the CHC and the well-baby clinic are compared with “the secret service” (27); “code orange (parents be alert)” (28) or “Child and Youth Health Care, we suspect that you suffer from the delusion of control” (29). The interactive process of the SPARK (i.e. listening to the parents and making shared decisions about subsequent care) however can contribute to diminishing feelings of being tested as a ‘good parent’. The good user experience as well as the high response rate to the SPARK procedure points to a high degree of acceptance by parents. The parent determines the direction, and the starting point is how problems are perceived by the parents. We hope that interactive methods such as the SPARK will be used more, with the assumption that this way of interacting with parents will have a positive influence on how parents perceive CHC.

With the proposed changes in care paradigms as demanded by new legislation it is also expected from (curative) youth care professionals to perform their interventions solution-oriented, based on the resolving power of the parent(s), and using the social network of families. Both YCA (e.g. the Signs of Safety approach (30, 31), Wraparound Care model (31, 32)) and preventive CHC (with the SPARK approach) make a move in that direction. Good connection and transfer to each other is needed, but not naturally. To illustrate the difficulty in connecting ways of working: even CHC nurses trained in different approaches (e.g. SPARK and Signs of Safety), still see these as two unconnected methods.

Directions for future research

The results in our research lead to several recommendations for further research. This is divided into future research and already deployed next steps.

With the recent transition, the responsibility of both (preventive) CHC and (curative) youth care is now in the hands of municipalities. This offers opportunities for preventive actions and short-term support based on the SPARK to avoid high costs in youth care with later intervention. Longitudinal research is needed to substantiate this assertion. In addition, future research on whether implementing the SPARK is cost-effective from a societal perspective, is important for further implementation of the SPARK.

As stated before the province of Zeeland may not be representative of some highly urbanized areas elsewhere in the Netherlands. The validity and feasibility of the SPARK in urbanized, multi-ethnic areas should also be studied. Moreover, further study is required to assess long-term outcomes. This implies that a new study should be set up, with the hypothesis that children who are screened with the SPARK will receive better fitting care and thereby have better outcomes than children seen during regular visits.

Although users were satisfied with the SPARK, they identified some topics for improvement. Shortening the SPARK, and making it more flexible, should lead to an instrument that is quicker to carry out, with equal discriminative capacity and an increase in user-satisfaction among CHC nurses. Redesigning the SPARK included increasing flexibility of questioning by domain (stepped on the basis of severity of any perceived problems), restating some questions, and developing a visual tool for faster querying. This was tested in close cooperation with a CHC team. The final redesign with a stepped wedge cluster-randomized controlled trial was compared with the first version of the SPARK used during home visits among 1240 children from 18 months selected from the municipal population registry. Preliminary analysis shows that the discriminative capacity remains equal, while satisfaction of professionals about the usability in practice has improved.

In addition, resources have been developed to facilitate a broad implementation of the SPARK (33). We have chosen a different approach for implementation than the usual way of implementing an intervention or instrument in one or two other organizations. We believe that implementation works better when people think first about the intervention / instrument to implement and take responsibility. Will it fit? How does it fit? Is it worthwhile? We decided that developing resources to enable professionals to implement the SPARK in their own organisation, with minimal support of the developers, would be a better choice. The resources include the following: a regional tour has been carried out to publicize the SPARK; train-the-trainer courses for educating SPARK implementers in CHC organizations; a supportive e-learning module for training CHC nurses; an instruction manual for performing the SPARK; a digital version of SPARK connected to the digital CHC file; and because we find "good use" very important, a licensing model including fidelity checks and accreditation for CHC nurses. Using the SPARK is free, but training is

required. Using it wrong will result in disappointed professionals and missed opportunities for connecting to parents. This approach has received prominent attention in several publications of ZonMw aimed at care providers and researchers (34-36). At this moment, three other organizations have started implementing the SPARK, besides GGD Zeeland. The follow-up project, "Applying care pathways in the CHC" (37), explored whether it is possible within the daily CHC practice to set up the use of care pathways in the period between two transition moments in life, with appropriate care for each child and parent. Based in the outcome of the SPARK, two pathways in this project were developed and tested: (1) a care pathway using e-consultations with healthy children with competent parents; and (2) a care pathway with interventions and, where necessary, additional visits by CHC professionals aimed at parenting, focused on collaboration with parents and partners working in the whole range with youth and parents (i.e. YCA professionals or social workers). The assessment of care needs and risks, and the associated choice of a particular care pathway was carried out by the CHC nurse at the age of 18 months, based on the SPARK. As part of a quasi-experiment, the process of care pathway development was followed, and the different pathways compared within daily CHC practice of GGD Zeeland in the period from December 2011 until the summer of 2013.

The generic basis of the SPARK provides opportunities for wider use, both 1. inside and 2. outside the CHC. 1. The SPARK, as described and tested in this thesis, has been used for the transition moment from infant to toddler, as part of the idea of a life course with transition moments, as previously suggested by van der Giessen (38). During the transition moments, and in dialogue with parents and child, it is determined which form of care is best suited in the intervening period to the next transition moment. This approach provides opportunities for expansion of the SPARK to other ages/transition moments in life. However, domains and context change in life, which may call for adapting the SPARK to the applicable transition moment, and for a follow-up study. The design and approach outlined in this thesis, and the methodology of the SPARK, would reapply with translation to other ages / transition moments in life, such as a prenatal SPARK, a SPARK for the transition to primary school and to secondary school, a SPARK for adolescence, and a SPARK for a final interview upon leaving high school. A prenatal version of SPARK has already been developed in the summer of 2014 and is tested for the first time in the winter of 2014/2015 in collaboration with TNO, as part of an investigation into improving prenatal home visits by CHC nurses (39). 2. In addition to the adaption of the SPARK to other ages and transition moments of children, it is interesting to consider the application and adaption to other groups and in other settings. Transition moments happen throughout the (adult) life course. Think of an interview on how someone wants to enter its final phase of life and which care fits best. With other settings, think about the aforementioned YCA but also about homecare and municipalities. At present, so-called "kitchen table conversations" are conducted throughout the country within the framework of the Social Support Act (in Dutch: WMO). A SPARK-inspired approach could be suitable for these conversa-

tions, as the effective elements of the SPARK are the structured, solution-oriented approach in dialogue with the client.

Final conclusions

It appears that a broad-scope structured review in dialogue with parents, leading to a joint decision-making process, has added value for both parents and CHC professionals. The advantage of working with the SPARK is that the parental capacity and resolving power of the parents is used, in addition to higher and more accurate detection rates of parenting and/or developmental problems, and professionalising how CHC nurses work. These advantages will not only benefit children and parent with intermediate or high risk, but also children and parents with low risk. When the SPARK is used during a home visit, we see additional value for the severe group with an increased and high risk, which also means in addition to helping child and family, there is also more value for money. However, it is ultimately a policy choice whether the results of this broad-scope, carefully designed care- and risk-assessment, in dialogue with parents, are considered sufficiently worthwhile to be implemented. The SPARK improves the regular consultation at 18 months in two ways: structuring the information-gathering while explicitly asking for parental concerns and care needs, and structuring decision-making on follow-up actions and risk assessment. A “kitchen table conversation” in dialogue between client and professional should also be professional, systematic, structured and validated. A careful implementation with training, fidelity checks and measuring outcomes contributes to “good use”.

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Chapter 8

Summary

In **chapter 1**, the background, relevance, new challenges, and outline of the thesis are described.

The aim of the research described in this thesis is to improve the early detection of parenting and/or psychological, somatic and social development problems in toddlers. The study was divided into two parts, based on the following research questions:

- A. What are the content, structure, and psychometric properties of a newly developed instrument for the early detection of parenting and/or developmental problems in toddlers?
- B. What is the added value of a home visit and the newly developed instrument compared to a visit to the well-baby clinic for the early detection of parenting and/or developmental problems in toddlers?

In part A, we developed a broad-scope structured interview that assesses parents' concerns and their need for support, using both the perspectives of the parent(s) and the experience of the child health care nurse: the Structured Problem Analysis of Raising Kids (SPARK). The SPARK instrument was tested in daily practice for feasibility, inter-rater reliability, convergent validity, discriminative validity, predictive value, and usability of parents as well as nurses.

In part B, we compared a home visit using the SPARK with a visit to the well-baby clinic either with the SPARK or with only care as usual, (i.e., without the SPARK). This comparison was to test whether a home visit improves early detection of parenting and developmental problems in young children, and whether the SPARK adds value to care as usual.

Part A

Development of a structured interview (chapter 2).

There is agreement in the field that early detection of parenting, health, psychosocial and developmental problems is an important part of preventive child and youth health care services (CHC). In the Netherlands, the task of early detection has been included in the national, statutory obligations of Dutch CHC since 2002, and was ratified by the Ministry of Health in 2013. However, no validated instruments exist for the early detection of parenting and/or psychological, somatic and social development problems of young children, which would be suitable for wide scale use in preventive child health care. In our opinion, such an instrument should be based on dialogue and joint decision making, as this uses and strengthens the power of both parent(s) and CHC professional.

Using an iterative process with close alignment between research and practice, we adapted and expanded an existing structured interview on the need for parenting support (Vragenlijst Onvervulde Behoeftte aan Opvoedingsondersteuning, VOBO) into the Structured Problem Analysis of Raising Kids (SPARK). The following elements were included as being necessary features: a broad scope that includes the child, its family and child rearing environment; a systematic approach of querying concerns and care needs; a dialogue between the parent(s) and professional; information about the true nature of ex-

perienced problems instead of only a signal of something wrong; and a joint decision between parent and professional about the aim and content of any subsequent care. The SPARK consists of 16 subject areas, ranging from somatic health to family issues, and uses both the parental perspective and the experience of the CHC professional. The first test showed that the SPARK is feasible in daily practice and clarifies risks and care needs for parenting and developmental problems in toddlers.

Validity and reliability of the SPARK (chapter 3).

With a cross-sectional study of 2012 18-month-old children living in Zeeland, a province of the Netherlands, we assessed the psychometric properties of the SPARK. The inter-rater reliability was very good to excellent, especially for the overall risk assessment and the physical domains. The SPARK proved itself to be discriminative, by distinguishing between areas with different socio-economic status-levels (SES) and between postal codes (representing both SES and urbanization). There were clear differences between extreme groups: children reported to the child protective services (before the age of 18 months) versus children with only positive scores on a set of parent-reported questionnaires on child development and parenting stress. The only psychometric property that was below expectations was the convergent validity. Correlations of SPARK-domains with related domains from self-reported questionnaires were significant, but very low. This lack of convergence is probably influenced by several aspects. First, the content and the way of questioning differ between the SPARK and the self-report questionnaires. Second, there was too little variation, due to (a) the majority of the children having no problems, and (b) the group that did not return the self-reported questionnaires included a large portion of the children with high risk on the SPARK. Finally, it is worth highlighting that users (both professionals and parents) were satisfied with the SPARK and also identified some topics for improvement.

Predicted value of the SPARK (chapter 4).

Although the SPARK covers a broad domain of family and child functioning and does not have an explicit and exclusive 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. Confirmed reports of child abuse and neglect to the Advice and Reporting Centers for Child Abuse and Neglect (ARCAN, in Dutch: Advies en Meldpunt Kinder mishandeling, AMK), together with confirmed reports to the Youth Care Agency (YCA, in Dutch: Bureau Jeugdzorg, BJZ) provide the most objective estimate of the presence of child abuse and neglect. Therefore, we used the combination of both confirmed reports to estimate the predictive validity of the risk assessment of the SPARK. All known risk factors for child abuse were significant predictors, as expected. The overall risk assessment of the SPARK is the strongest predictor for future 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 differed significantly from the children without a report with regard to family characteristics, but not with regard to child characteristics. 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.

Part B

Early detection of parenting and/or developmental problems in toddlers: A randomized trial (chapter 5).

To answer the question of whether a home visit improves the early detection of parenting and/or psychological, somatic and social development problems in young children, in comparison to a visit to the well-baby clinic when using the SPARK on both locations, 4481 eligible 18-month-old children and their parents were randomized to either a home visit or a visit to the well-baby clinic. Using the SPARK at home identified significantly more children with a high risk compared to a clinic visit (3.7 vs. 2.6%), and fewer children with an increased risk (19.1 vs. 20.7%; overall $p = 0.028$). Both parents and CHC nurses expressed more often need of support and reported significantly better experiences at home. Our findings support the assumed advantages of a home visit. More and better information can be derived on family situation and housing conditions, interaction between child and parent(s), more parents are reached, and parents and children are in their own familiar environment, “more at ease”. Also, parents with simple questions seemed to benefit from a home visit, as they reported more concerns at home and asked for more information or advice. The small number of children that could not be contacted is an indication of the strength of CHC in the Netherlands, which reaches up to 98% of all children in their first year and 90% of all children between 1-4 years.

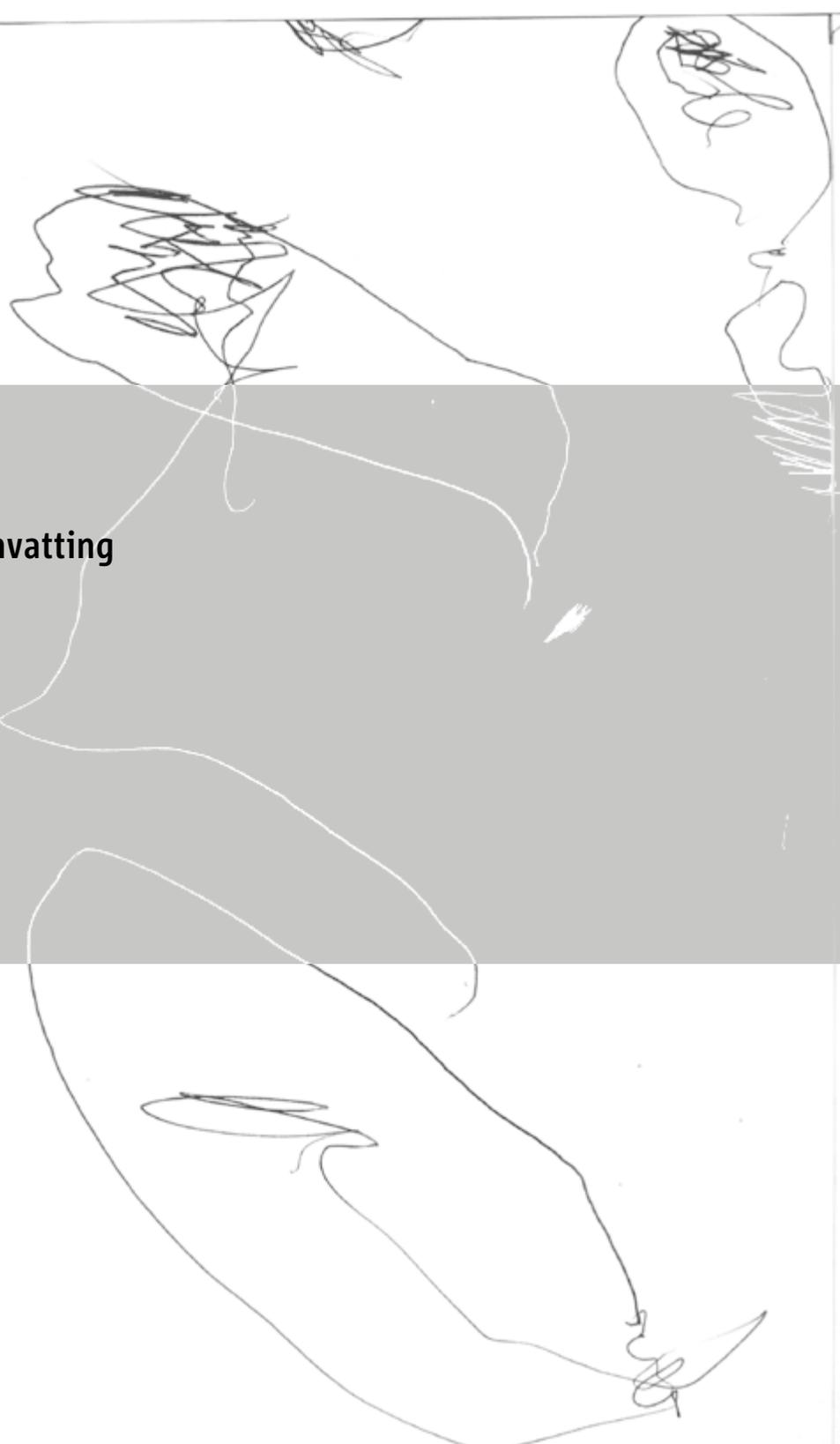
Early detection of parenting and/or developmental problems in young children: Non-randomized comparison of visits to the well-baby clinic with or without a validated interview (chapter 6).

To assess whether the SPARK has added value to care as usual, we set up a controlled clinical trial comparing regular visits to the well-baby clinic with visits using the SPARK. Using propensity score adjustment ensured comparable populations. We observed a discrepancy: professionals in usual care found fewer children with high (1.2 vs. 2.6%) or increased risk (14.5 vs. 20.7%) than with the SPARK ($p = 0.002$), but indicated that more help was needed. In contrast, no additional contact was advised in 25% of the children labeled as high risk by the professionals in the care-as-usual group, while all high-risk children visited with the SPARK received additional contact. Including the concerns and care needs of parents in the decision-making process with a structured and validated instrument gives

professionals information beyond their professional viewpoint, and creates a joint decision that fits better with care needs of parents and risk level. By not using the SPARK, the chances for early detection and joint decision-making with parents on what to do next will be missed.

In **Chapter 7**, the main results, further research developments and implications are discussed. With the use of the SPARK, the early detection of parenting and/or developmental problems is improved when compared with care-as-usual. In addition, the psychometric properties of the SPARK show that the differences in identification between CHC professionals are reduced through the use of a standardized instrument. With the interactive procedure of the SPARK (i.e. listening to the parents and making joint decisions about subsequent care), the parent determines the direction, and the starting point is especially the problems as perceived by the parents. In our opinion, the SPARK should be applied to all children in the preventive CHC, thereby clarifying which care trajectory is most suited for each child for the following period. With the changes in care paradigms it is also expected from (curative) youth care professionals to perform their interventions solution-oriented, based on the resolving power of the parent(s), and using the social network of families. This fits with the SPARK approach. With using a same interactive procedure including a child (un)safety check and a good transfer between CHC and follow up caregivers it could be possible to give earlier, faster and better care to children and their parents.

In conclusion, the results offer several possibilities to improve the early detection of parenting and/or psychological, somatic and social development problems among young children.



Samenvatting

In **hoofdstuk 1** worden de achtergrond, relevantie, nieuwe uitdagingen voor de Nederlandse preventieve Jeugdgezondheidszorg (JGZ) en de opbouw van dit proefschrift beschreven.

Het doel van het onderzoek beschreven in dit proefschrift is om vroegsignalering van opvoed- en opgroei problemen bij jonge kinderen te verbeteren. De studie is verdeeld in twee delen, vanuit de volgende onderzoeksvragen:

- A. Wat is de inhoud, structuur, en psychometrische eigenschappen van een nieuw ontwikkeld instrument voor vroegsignalering van opvoed- en/of lichamelijke, psychische, sociale en cognitieve ontwikkelings problemen bij peuters?
- B. Wat is de toegevoegde waarde van een huisbezoek en het nieuw ontwikkelde instrument in vergelijking met een bezoek aan het consultatiebureau voor vroegsignalering van opvoed- en/of lichamelijke, psychische, sociale en cognitieve ontwikkelings problemen bij peuters?

In deel A, ontwikkelden we een gestructureerd interview met een brede scope die zorgen van ouders en hun behoefte aan steun meet, en waarbij het perspectief en de ervaring van ouder(s) wordt gecombineerd met de expertise van de JGZ-professional: Signaleren van Problemen en Analyse van Risico bij opvoeden en ontwikkeling van Kinderen (SPARK). Het instrument de SPARK hebben we in de dagelijkse praktijk getest op haalbaarheid, interrater betrouwbaarheid, constructvaliditeit, onderscheidend vermogen, voorspellende waarde, en het gebruikersoordeel van zowel ouders als jeugdverpleegkundigen.

In deel B, vergeleken we een huisbezoek met gebruik van de SPARK met een bezoek aan het consultatiebureau hetzij met gebruik van de SPARK dan wel 'care-as-usual' (dwz zonder gebruik van de SPARK). Met deze vergelijking wilden we testen of met een huisbezoek de vroegsignalering van opvoed- en opgroei problemen bij jonge kinderen verbeterd, en of de SPARK toegevoegde waarde heeft ten opzichte van de 'care-as-usual'.

Deel A

Ontwikkeling van een gestructureerd interview (hoofdstuk 2).

Er is consensus over het belang van vroegsignalering van opvoed- en opgroei problemen bij jonge kinderen en de belangrijke rol daarbij voor de preventieve JGZ. In Nederland is deze taak van vroegsignalering in 2002 vastgelegd in het landelijk BasisTakenPakket, en in 2013 op advies van commissie de Winter bevestigd door het ministerie van VWS. Met name voor de jonge leeftijdsgroep waren er echter geen gevalideerde vroegsignaleringinstrumenten beschikbaar die tevens passen bij de brede doelstelling van de JGZ in Nederland. Naar onze mening zou zo'n instrument moeten werken in dialoog met de ouders en leiden tot een gezamenlijke besluitvorming zodat gebruik wordt gemaakt van de kracht van zowel ouder(s) als JGZ-professional.

Middels een interactief en iteratief proces in nauwe samenwerking tussen wetenschap en praktijk, hebben we een bestaand interview naar de behoefte aan opvoedondersteuning (Vragenlijst Onvervulde Behoefte aan Opvoedondersteuning, VOBO) aangepast en uitge-

breid tot de SPARK. De volgende elementen aan het instrument werden daarbij als vereisten meegenomen: een brede scope met daarin aandacht voor het kind, zijn/haar gezin en het opvoedklimaat; een gestructureerde aanpak van (door) vragen naar de zorgen en zorgbehoeften van ouders; een dialoog tussen ouder(s) en professional; informatie over de aard van het ervaren probleem in plaats van alleen een signaal dat er iets aan de hand is; en een gezamenlijke besluitvorming tussen ouder en professional over doel en inhoud van de vervolgzorg. De SPARK is een gestructureerd interview bestaande uit 16 domeinen, variërend van gezondheid tot gezinszaken, en combineert het perspectief en ervaring van de ouder met de expertise van de JGZ-professional. De eerste test liet zien dat de SPARK bruikbaar is in de dagelijkse praktijk en inzicht geeft in risico's en zorgbehoefte van opvoed- en opgroei problemen bij peuters.

Validiteit en betrouwbaarheid van de SPARK (hoofdstuk 3).

Middels een cross-sectionele studie met 2012 18 maanden oude kinderen wonend in de provincie Zeeland, hebben we de psychometrische eigenschappen van de SPARK onderzocht. De interrater betrouwbaarheid was heel goed tot uitstekend, zeker voor de overall risico-inschatting en de fysieke domeinen. De SPARK heeft bewezen discriminerend te zijn door onderscheid te maken tussen gebieden met verschillende sociaaleconomische status en tussen postcoderegio's (representatief voor zowel sociaaleconomische status als urbanisatie). En er waren duidelijke verschillen tussen extreme groepen: een groep kinderen met een bevestigde melding bij het Advies en Meldpunt Kindermishandeling (AMK) en/of Bureau Jeugdzorg (BJZ) voor de leeftijd van 18 maanden versus een groep kinderen met alleen positieve scores op alle vragenlijsten. De enige meeteigenschap die lager scoorde dan wij verwachtten was de constructvaliditeit. Correlaties tussen SPARK-domeinen en eraan gerelateerde domeinen van zelfrapportagevragenlijsten waren significant en vielen binnen het verwachte patroon, maar waren erg laag. Verschillende aspecten zijn waarschijnlijk van invloed op deze beperkte overeenkomst. Ten eerste is de inhoud en de manier van vragen met de SPARK en de zelfrapportagevragenlijsten zeer verschillend. Ten tweede was er weinig variatie omdat (a) de meerderheid van de kinderen geen problemen heeft, en (b) bevat de groep die geen zelfrapportagevragenlijst heeft teruggestuurd een groot deel van de kinderen met een hoog risico volgens de SPARK. Ten slotte, niet onbelangrijk, de gebruikers (zowel ouders als professionals) gaven bij het gebruikersoordeel naar de SPARK aan tevreden te zijn en benoemden ook enkele verbeterpunten.

Voorspellende waarde van de SPARK (hoofdstuk 4).

Hoewel de SPARK een brede scope heeft en zich richt op zowel de ontwikkeling van het kind als het functioneren van het gezin, en zich niet expliciet richt op het signaleren van kindermishandeling verwachten wij een relatie tussen verhoogd risico op opvoedproblemen en meldingen van kindermishandeling en of verwaarlozing. Bevestigde meldingen

van kindermishandeling en of verwaarlozing bij het AMK samen met bevestigde aanmeldingen bij BJZ geven de meest objectieve inschatting van de aanwezigheid van kindermishandeling en of verwaarlozing. Daarom hebben wij deze combinatie van bevestigde meldingen gebruikt om de voorspellende waarde van de risico inschatting van de SPARK te bepalen. Alle uit de literatuur bekende risicofactoren voor kindermishandeling waren significante voorspellers, zoals verwacht. De overall risico inschatting van de SPARK bleek de sterkste voorspeller voor een toekomstige melding bij AMK en BJZ in de 1,5 jaar na het afnemen van de SPARK (odds ratio van hoog risico versus laag risico: 16,3 [95% betrouwbaarheidsinterval: 5,2-50,8]). Bij het controleren voor de risico inschatting blijft alleen de som van bekende risicofactoren en werkloosheid van de vader over als significante voorspellers. De kinderen in de groep met een melding verschilden significant van de kinderen in de groep zonder melding wat betreft gezinskenmerken maar niet wat betreft kindkenmerken. Systematisch de zorgen van ouders verkennen en uitvragen met een instrument als de SPARK kan bijdragen aan het voortijdig herkennen van gezinnen met risico op grote opvoedproblemen.

Deel B

Vroegsignalering van opvoed- en opgroei problemen bij peuters: een gerandomiseerde vergelijking van huisbezoek versus bezoek aan het consultatiebureau (hoofdstuk 5).

Om de vraag te kunnen beantwoorden of een huisbezoek bijdraagt aan verbetering van vroegsignalering van opvoed- en/of lichamelijke, psychische, sociale en cognitieve ontwikkelings problemen bij jonge kinderen in vergelijking met een bezoek aan het consultatiebureau wanneer op beide locaties gebruik wordt gemaakt van de SPARK, hebben we alle 4481 in aanmerking komende 18 maanden oude kinderen en hun ouders gerandomiseerd naar een huisbezoek of een bezoek aan het consultatiebureau. Met gebruik van de SPARK tijdens het huisbezoek werden significant meer kinderen met een hoog risico gevonden in vergelijking met een bezoek aan het consultatiebureau (3,7 vs. 2,6%), en minder kinderen met een verhoogd risico (19,1 vs. 20,7%; overall $p = 0,028$). Tijdens een huisbezoek gaven zowel ouders als jeugdverpleegkundigen vaker zorgbehoeften aan en rapporteerden significant betere ervaringen. Onze bevindingen ondersteunen de veronderstelde voordelen van een huisbezoek. Meer en betere informatie wordt verkregen door het thuis komen in de de gezins- en woonsituatie, het zien van de interactie tussen kind en ouder(s) in de eigen omgeving, meer ouders worden bereikt, en ouders en kinderen zijn in hun eigen omgeving meer op hun gemak. Ook ouders met eenvoudige vragen lijken te profiteren van een huisbezoek, afgeleid uit het feit dat zij meer zorgen bespreken en vragen om informatie tijdens een huisbezoek. Het beperkte aantal kinderen dat niet kon worden bereikt is een indicatie van de kracht van de Nederlandse JGZ, die meer dan 98% van alle kinderen in hun eerste jaar met regelmaat zien en 90% van alle kinderen tussen het 1e en 4e levensjaar.

Vroegsignalering van opvoed- en opgroei problemen bij peuters: een niet gerandomiseerde vergelijking van bezoeken aan het consultatiebureau met en zonder gevalideerd interview (hoofdstuk 6).

Om te bepalen of de SPARK toegevoegde waarde heeft ten opzichte van de 'care-as-usual' hebben we een gecontroleerde vergelijking opgezet waarin we gebruikelijke bezoeken aan het consultatiebureau hebben vergeleken met bezoeken aan het consultatiebureau waarbij de SPARK werd gebruikt. Door het gebruik van propensity score is het vergelijken van de populaties gewaarborgd. We zagen een discrepantie: professionals in de 'care-as-usual' groep vonden minder kinderen met hoog (1,2 vs. 2,6%) of verhoogd risico (14,5 vs. 20,7%) dan professionals die werkten met de SPARK ($p = 0,002$), maar tegelijkertijd gaven zij aan dat meer zorg nodig was. In contrarie, bij 25% van de kinderen met een door de jeugdverpleegkundige in de 'care-as-usual' groep ingeschat hoog risico werd geen extra contact geadviseerd terwijl bij alle kinderen dit tijdens een bezoek aan het consultatiebureau met SPARK als hoog risico werden ingeschat een extra contact werd afgesproken. Het gebruiken van de door de ouders ervaren zorgen en zorgbehoefte in het besluitvormingsproces met een gestructureerd en gevalideerd instrument levert professionals aanvullende informatie op hun professionele blik en leidt tot een gezamenlijke beslissing die beter past bij de zorgbehoefte van ouders en de mate van risico. Door geen gebruik te maken van de SPARK worden kansen op vroegsignalering en gezamenlijke besluitvorming met ouders over welke vervolgzorg het best bij hun en hun situatie past gemist.

In **hoofdstuk 7**, worden de belangrijkste resultaten, vervolg onderzoeksmogelijkheden en implicaties beschreven. Met gebruik van de SPARK wordt vroegsignalering van opvoed- en opgroei problemen verbeterd in vergelijking met de 'care-as-usual'. Bovendien laten de psychometrische eigenschappen van de SPARK zien dat verschillen in vroegsignalering tussen JGZ-professionals verkleinen door het gebruik van een gestructureerd instrument. Met de interactieve werkwijze van de SPARK (d.w.z. luisteren naar ervaringen van ouders en komen tot een gezamenlijke beslissing over het best passende vervolg) bepalen ouders de richting en houden de regie, het startpunt is de door ouders ervaren zorgen. Naar onze mening zou de SPARK moeten worden ingezet bij alle kinderen in de preventieve JGZ, van daaruit wordt voor ieder kind duidelijk wat voor de komende periode het best passende zorgpad zou zijn. Met paradigmaverschuivingen in de zorg wordt ook van de (curatieve) jeugdzorgprofessionals verwacht dat door hun ingezette interventies oplossingsgericht zijn en gebruik maken van de eigen kracht van ouder(s) en diens sociale netwerken. Dit komt overeen met de SPARK aanpak. Door het gebruik van een zelfde interactieve methode met een veiligheidsscheck voor het kind en een goede overdracht tussen JGZ en opvolgende zorgverleners is het mogelijk om eerder, sneller en beter zorg te verlenen aan kinderen en hun ouders. De conclusie is dat de resultaten uit dit proefschrift verschillende mogelijkheden bieden om vroegsignalering van opvoed- en/of lichamelijke, psychische, sociale en cognitieve ontwikkelings problemen bij jonge kinderen te verbeteren.



Key messages

*gemaakt door Joey!
10 maanden*

PART A The content, structure, and psychometric properties of a newly developed instrument for early detection of parenting and/or developmental problems in toddlers

Key findings

- Early detection of parenting and child-developmental problems is important.
- There is a lack of validated instruments for the early detection of parenting and/or developmental problems of young children, suitable for broad use in preventive child health care (CHC).
- We developed and validated an instrument that addresses a broad range of topics, using a three-step model and includes the perspectives and experience of parents as well as CHC professionals: the Structured Problem Analysis of Raising Kids (SPARK).
- The SPARK is a valid and reliable structured interview for the early detection and assessment of parenting and/or developmental problems in young children.
- The SPARK is suitable for the combined task of early problem detection and assessment of care needs of parents, which can immediately be put to use in preventive child health care.
- Including concerns and care needs of parents in the decision-making process gives professionals information beyond their professional viewpoint, and results in a joint decision that fits better with care needs of parents.

PART B The added value of a home visit and the newly developed instrument compared to a visit to the well-baby clinic for early detection of parenting and/or developmental problems in toddlers

Key findings

- Using the SPARK at home identifies more young children at risk of parenting and/or developmental problems than at the well-baby clinic.
- Parents and CHC nurses reported better experiences with the SPARK when used during a home visit.
- The SPARK improves the early detection of parenting and child-developmental problems in young children, compared to regular visits without an instrument.

Key recommendations

- Use a valid, reliable, and feasible instrument with all children, every transition moment in life course. Valid and reliable information by systematically exploring and evaluating parental concerns with an instrument like the SPARK made it possible to set up the use of care pathways in the period between two transition moments in life, with appropriate care for each child and parent.
- Take the chance to improve the quality of life of “your children and parents” or “your citizens”: directly by using the SPARK, and indirectly by aggregation of the individual SPARK data to collective data. This can give CHC professionals and policy makers a better understanding of the health and parenting needs of young parents in their community.
- Take care for training, implementation and continuation of the SPARK. Wrong use will result in disappointed professionals and missed opportunities for connecting to parents.
- In addition to the adaption of the SPARK to other ages and transition moments of children, it is interesting to consider the application and adaption to other groups and in other settings.



Dankwoord

Waar begin je een dankwoord van een traject waarin je met zoveel mensen direct en indirect hebt samengewerkt? Een traject waarin ik met veel plezier, zo veel heb geleerd, dat me ondanks de vele uren die er in zitten vooral energie heeft opgeleverd, en alleen mogelijk was dankzij de vele samenwerkingen. Zonder iemand te vergeten? Overigens een traject dat ik zo weer zou starten en dat ik ook iedereen zou willen aanraden. Heb je een idee, vraag of ervaring uit de praktijk pak de kans om die uit te werken, wetenschappelijk te beantwoorden en te delen!

Zorg dan wel dat je net zulke inspirerende, enthousiaste begeleiders rond je verzamelt met excellente en aanvullende kennis die dit alles ook nog eens opbouwend kunnen overbrengen als ik heb mogen ervaren. Bedankt! Guus, Jo en Henk. Henk wil je ook mijn dank aan Elsie overbrengen voor al die keren dat jouw aandacht en tijd naar onze gezamenlijke projecten uitging in plaats van naar je eigen gezin.

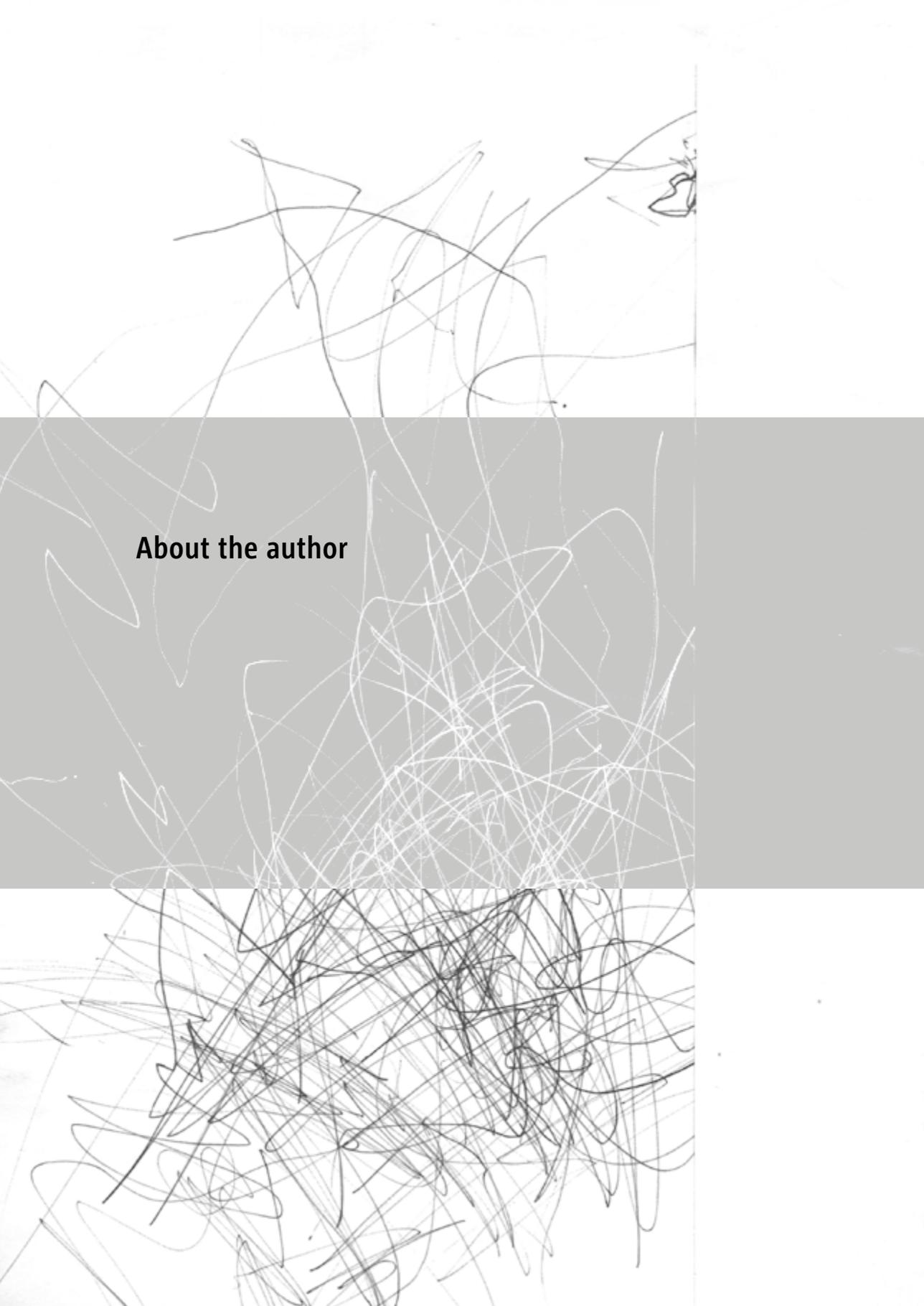
Zorg dan wel dat je samenwerking zoekt met een veld dat net zo meedenkend en gedreven is voor de inhoud van hun vak als waar ik mee heb mogen samenwerken. Bedankt! alle JGZ professionals, 'jullie ouders' en ondersteunende medewerkers. Dankzij jullie meedenken en verzamelde gegevens kon ik inzicht geven hoe 'onze' dagelijkse praktijk werkt en hoe 'we' dit verder kunnen verbeteren.

Als je merkt dat bij het delen van de eerste ideeën energie, nog meer ideeën en vragen vrijkomen, weet dan dat je op de goede weg zit. Bedankt! Thea, Henny en Trees.

Zorg dan wel dat je je verhaal in elk stadium van het traject kan blijven delen. Dankzij alle geïnteresseerde, kritische en verduidelijkings vragen over het project, de resultaten, de voortgang of hoe het mij zelf ging, kon ik de opbrengsten van het traject niet alleen beter en duidelijker verwoorden maar ook beter keuzes maken en het traject met veel plezier dan wel (nieuwe) moed vervolgen. Bedankt! collega's onderzoeksgroep 'Maten en Meten, IJken is Weten!'; collega's en oud-collega's GGD Zeeland, Allévo, Zorgstroom en ZorgSaam, 'landelijke' (JGZ) collega's, Ada, Meike, Tom, Conny en Marco.

Dan komt het moment dat je een datum mag aanvragen en je manuscript naar de beoordelingscommissie mag sturen. Dat is een geweldig moment. Het brengt nog wat organisatorische stressmomenten met zich mee maar wordt door de reacties die je krijgt zo bijzonder. Ik voel me echt vereerd. Bedankt! Elise, Jet, Frans, Karel en Marieke. Ada en Meike geweldig dat ik jullie uiteindelijk echt kon vragen mijn paranimfen te zijn.

En als laatste, wellicht belangrijkste advies, koester je naasten. Zonder hen kom je nergens. Bedankt! Ruud, Anouk, *Elina*, Nadia, Manon, Elisa, pa en ma. Omaatje en oma het is af!

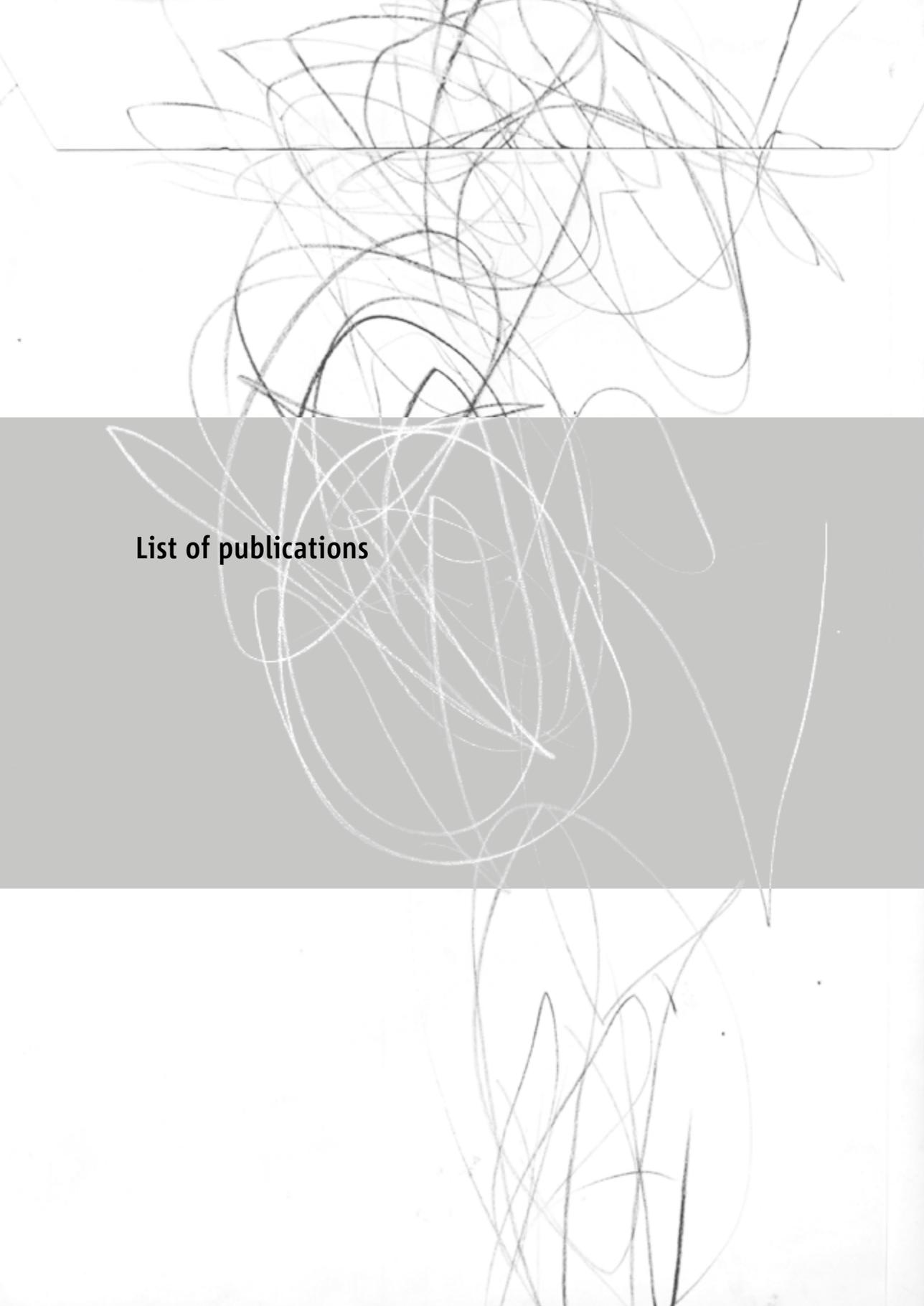
The image features a white background with a central horizontal grey bar. The entire page is overlaid with a dense, chaotic pattern of thin, black, hand-drawn scribbles. These scribbles are most concentrated in the lower half of the page, where they form a thick, tangled mass. In the upper half, the scribbles are more sparse and delicate, with some lines extending across the grey bar. The overall effect is one of abstract, gestural energy.

About the author

Ingrid Staal was born on the 12th of April 1966 in Oostburg, the Netherlands. In 1984, she finished secondary school (St. Eloy, Oostburg). Subsequently, she completed her bachelor degree in Nursing in 1988 (Hogeschool Zeeland). Afterwards she gained nursing experience within the (youth and forensic) psychiatry, home nursing service and home care. Since 1996 she has been working in preventive Child Health Care (CHC), first as a nurse, then from 2003 to 2012 as staff nurse and since 2012 as a project leader in innovation and academic CHC at 'GGD Zeeland' (Municipal Public Health Service). She followed the postgraduate 'Parent and Child Care' (Hogeschool Utrecht) in 2000 – 2001 and graduated in 2005 from the University of Utrecht in Nursing Science.

The subject of this thesis was born from the practical question: 'What is the value of a home visit compared to a visit to the well-baby clinic at the age of 18 months in preventive CHC' and the drive of Ingrid to answer this question with scientific evidence. As part of this Ingrid started as a researcher at Julius Center for Health Sciences and Primary Care of the University Medical Center in Utrecht in 2006, besides her work in the province of Zeeland. All studies described in this thesis were conceived and conducted in close cooperation between practice and research. The project 'Comparison home visit versus a visit to the well-baby clinic' received the 'Jeugdgezondheidszorg Innovatieprijs' (Preventive Child and Youth Health Care Innovation Award) from the Dutch Center of Child and Youth Health Care (NCJ) in 2008.

Furthermore, she was involved in various other studies and innovations in preventive CHC, such as the development of an e-learning SPARK; development and evaluation of the pre-SPARK (version of the SPARK suitable for use during prenatal visits); development, implementation and evaluation of care pathways in CHC and use of e-consults in CHC. Ingrid is active nationwide as a member of different committees mostly from a research and practice perspective e.g. 'Wetenschappelijke commissie jeugdverpleegkundigen van de V&VN' (Scientific Committee or preventive Child and Youth Health Care Nurses), editorial board member of 'TJGZ' (Journal of Child and Youth Health Care), 'ZonMw Commissie richtlijnen JGZ' (Committee of guidelines preventive Child and Youth Health Care) and 'Erkenningscommissie effectieve jeugdinterventies' (Committee assesses the quality and effectiveness of youth interventions). As well, she is a daughter, granddaughter, wife, mother and grandmother.

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List of publications

2005

Staal IIE, Roodzant-Velthausz MD, Reerink JD, Schrijvers AJP. (2005) Huisbezoek bij peuters van 18 maanden in de provincie Zeeland. *Tijdschrift voor Jeugdgezondheidszorg* 37(3):42-6.

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2015

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Submitted

Staal IIE, Van Stel HF, Hermanns JMA, Schrijvers AJP. Early detection of parenting and developmental problems in young children: nonrandomized comparison of visits to the well-baby clinic with or without a validated interview. Submitted.

(excuus voor het getrabbel, we zagen dit even aan als een bladspier....)

