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HOME VISITATION IN FAMILIES AT RISK FOR CHILD MALTREATMENT: ANALYSIS OF EFFECTS

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1 ABSTRACT

Over the past decades a large number of programs for the primary prevention of child maltreatment in families at risk have been designed. This study aims to determine the efficacy of such a program implemented in the Netherlands.

In a randomized controlled setting including 500 families at risk for maltreatment, six home visits were provided by specially trained Well Baby Clinic (WBC) Nurses over a period of eighteen months. Effects of the intervention were evaluated through comparison of a baseline measurement and consecutive measurements at 1 and 2 years of age of the index-child. Parental self-reported parameters were abuse potential (CAP), parenting attitudes (AAPI), child psychosocial development and family burden (KIPPPPI) as well as social support. Additional information was obtained from physicians and from the Dutch maltreatment reporting agency.

Parental expectations as well as child development significantly improved and a clinically significant reduction of the risk for maltreatment was achieved in almost a quarter of the families visited, over twice as much as in the control group (22% versus 8%). An analysis of trends revealed particular benefits for families at increased risk. No significant between-group differences were found based on the information from consulted physicians except for families in the intervention group being more punctual regarding their WBC-appointments. A significantly larger proportion of successful referrals to psychological care were found in the intervention group. Maltreatment reports were made slightly more often about families in the control group when excluding reports from visiting nurses. Combined reports suggested an increase of the early detection of maltreating families in the intervention group.

The results of the program suggest a modest success, which is comparable to similar studies in other countries. Further analysis of data to determine specific factors for success as well as follow-up of participating families is recommended.

2 INTRODUCTION

Although there has been an interest in child maltreatment since the beginning of the previous century (^{see 22; 46}), it was not until 1962, when Kempe and others called attention to the ‘battered child syndrome’ (³¹), that child maltreatment became a multi-disciplinary focal point. Just as Helfer (1976) predicted, over the last decades this focus widened from recognition of the most serious form to the initiation of screening and prevention programs (²⁷). As knowledge on magnitude, causes, consequences and treatment possibilities increases it becomes clear that primary prevention is indeed our best option (^{13; 20; 38}). Reports on the increasing detection of child maltreatment cases and sequelae (^{48; 51}) emphasize the urgency of the development and implementation of primary preventive programs.

Over the past decades a large number of different programs have been developed, using different approaches to prevention. Increasingly these programs have been subject to evaluation. Subsequent reviews of systematically evaluated studies demonstrated that primary prevention, especially designed as home visitation, holds promise, although results are ambiguous (^{see 19; 23; 36; 37}). A recent meta-analysis of preventive interventions found 28 programs (25 of which were situated in the United States), with a wide variety of designs regarding theoretical foundation, target population, onset, duration, frequency and program objectives (^{18; 19}). The measurements used to determine the effects of such programs are related to reports of maltreatment, medical history of the child, (mental) health of the child and the parent, parent-child interaction, family functioning and family context (^{18; 19}). This variety in design and outcome parameters may well be one of the causes for the ambiguous results that are found thus far. The search for the most successful design and outcome parameters continues.

In the Netherlands an attempt was made to contribute to these developments in prevention by implementing a program of home visitation in families at risk for maltreatment. This program was designed as a randomized controlled trial and was named Project OKé (an abbreviation of *Ouder- en Kindzorg extra*, meaning Parent and Childcare extra). Different aspects of the program were designed based on reviews of available research and theory. Process evaluation of the implementation of this program has demonstrated a high level of satisfaction in

participants and a general sense of accomplishment in home visitors. Furthermore client retainment was high and protocol implementation, especially regarding the planned number of home visits, was a success. The number of risk factors found at inclusion, the rate of family stress and the time spent per family were determined to be variables that might interfere with effects of the intervention (see chapter 7). The quality of this program can only be fully established once a systematic effect evaluation has been conducted. Such is the purpose of this chapter.

Based on a combination of two theories, the ecological theory of Belsky (⁶⁻⁸) and the theory of parental awareness introduced by Newberger and elaborated by Baartman (^{1; 2; 43}), several objectives for this study were formulated. Evidently the primary objective is the prevention of child maltreatment and consequentially the reduction of the risk of maltreatment. It is reasoned that this reduction should be realized by improving parental awareness through the enhancement of knowledge, attitudes and skills related to child rearing and the understanding of the parental developmental history. Furthermore reduction of the risk for maltreatment should be helped through the establishment of functional connections to professional support as well as the enhancement of the social support system. This study seeks to determine the effects of home visitation versus normal care in families at risk, on parenting attitudes, child development, family stresses, social support and risk for maltreatment. In addition differences on (mental) health-related outcomes are studied.

3 METHODS

For this home visitation program families at risk were selected, from the entire population of families with newborn children in the northern part of the province South Holland, by means of a questionnaire addressing risk factors for child maltreatment. The questionnaire consisted of a page for the Well Baby Clinic (WBC) nurse to fill out and three pages for the parents, one with general questions and one for both father and mother. The WBC nurse visited the families two weeks after the birth of a child and collected the questionnaires. Twenty-three demographic and psycho-social risk factors, such as single parenthood, childhood experiences of maltreatment, social isolation and dysphoria (i.e. depression, psychiatric disorders and severe psychological distress) as well as the nurses' 'concern' about a family were addressed in this questionnaire. Response could result in a maximum of 21 points. A score of 1 point was enough to select a family (see chapter 5).

A total of 1263 families out of 8899 were selected by means of this questionnaire (see figure 1 and chapter 5). Families were approached for the program and asked to fill out a baseline measurement and a consent form with respect to participation and agreement to filling out questionnaires. Permission to send questionnaires to both the general practitioner and the WBC-physician was also obtained. Families responding with signed consent were randomly assigned to either the control group or the intervention group through a computer program using an undisclosed sequence of numbers to assign to individual cases. A program secretary sent out written notification to families in the control group along with information about a child rearing telephone-helpline available in the Netherlands. Home visiting nurses approached families in the intervention group by telephone to set a date for the first home visit.

All families in the intervention group received home visits by a specifically trained WBC-nurse. The home visitation program was devised to provide a total of six home visits, each with a duration of 75 minutes, at the child's age of six weeks, three months, six months, nine months, twelve months and eighteen months. A consultation by telephone was scheduled at fifteen months. The focal points for each visit were the parental development, the family social support system and the child rearing conceptions of the parent (see chapter 7).

3.1 Instruments for effect evaluation

Aside from the baseline, measurements were taken twice, first at the child's age of one year and again at the child's age of two years, in order to measure the effects during the intervention as well as the persistence of effects six months after the last home visit. For this purpose questionnaires were sent to parents and, if consent was provided, to general practitioners (in 83.6% of the cases) and WBC-physicians (in 80.8% of the cases). All questionnaires for the physicians were designed especially for the program. Questionnaires for the parents were sent per family and parents were free to decide who would fill them in. In each measurement over 90% of the questionnaires were filled in by mothers. In 93% of the families one parent consistently responded to all measurements.

3.1.1 Parental evaluation

The parental questionnaire consisted of four instruments and some general information. This information was used for a demographic profile of the participants (such as age, level of education and number of children - see table 1). Other general information was related to the birth of a child since the start of the program as well as the family's medical consumption. The first instrument deployed is the Adult Adolescent Parenting Inventory (AAPI) version 2. The AAPI, containing four constructs, was first developed in 1979 ⁽⁴⁾. In 1999 the AAPI was revised and a fifth construct was added. The internal reliability of the constructs ranges from .75 to .86 and test-retest reliability for the total test was reported at .76. The inventory was normed on a sample of more than 2000 adults and 6500 adolescents, including separate samples of abusive adults and abused adolescents ⁽²⁶⁾. The five constructs of the AAPI 2 are 'Inappropriate parental expectations' (A), 'Parental lack of an empathic awareness of children's needs' (B), 'Strong belief in the use and value of corporal punishment' (C), 'Parent-child role reversal' (D) and 'Oppressing children's power and independence' (E). For each construct norm scores between 1 and 10 have been developed. Scores between 4 and 7 are considered mid-range. Scores above 7 represent a nurturing, non-abusive parenting philosophy ⁽³⁾. All five constructs are used in this study.

The AAPI has not been used previously in Dutch-speaking countries. For the purpose of this study it had to be translated. In order to ensure linguistic validation a process of 'back translation' was applied which means translation of the original

wording into (in this case) Dutch and back to English followed by a comparison of both English versions, which allows for the clarification of discrepancies. Proper linguistic validation requires more than the translation of a string of words from one language into an equivalent string of words in another language. It requires that comparability in meaning is achieved, or in other words, conceptual equivalence (¹⁶). This is accomplished best by employing native speakers from both countries who are familiar with culture-related concepts behind the wording of questions as has been done in this study. The Dutch version of the AAPI has resulted in generally acceptable Cronbach's alphas at baseline: .78 in constructs A and B, .79 in construct C, .75 in construct D and .50 in construct E.

The second instrument used in the parental questionnaire is the short version of the Child Abuse Potential Inventory (CAPI). This instrument originally contained 160 statements to which parents had to agree or disagree. Each worrisome answer is assigned a number of points, ranging from 1 to 23 and yielding a possible total score of 485. An elevated score indicates an increased risk for maltreatment. The statements are divided over six scales, the main scale being the 'abuse potential' scale. This main scale can again be divided into six 'factor scales', related to distress, rigidity, unhappiness, problems with child and self, problems with the family and problems with others (⁴⁰). The CAPI yields a correct classification rate of 96% for various types of maltreatment (^{40, 42}). In the short version the main ('abuse potential') scale is reduced from 77 to 70 items through removal of the factor scale 'problems with child and self', resulting in a maximum total score of 450 points. Confirmation of the internal consistency and correlation to the original instrument is yet to be published but preliminary results indicate that both are very high (⁴¹). A Dutch translation of the full CAPI has been deployed by the universities of Leuven (Belgium) and Amsterdam (Netherlands, Vrije Universiteit). The latter reported an internal consistency of .93 (^{sec 32}). The short version of the CAPI (from here on referred to as the CAP) has not been used previously in Dutch-speaking countries. In this study the CAP resulted in a Cronbach's alpha of .86.

The third instrument deployed is a Dutch questionnaire developed especially for use at Well Baby Clinics, called the Short Instrument for the Inventory of Psychological and Pedagogical Problems (*Kort Instrument voor Pedagogische en Psychologische Probleem Inventarisatie*, KIPPPPI) (³⁴). Several versions of this

instrument are available, deploying questions specific for different developmental stages of infants and toddlers aged 0–5 years. Reliability of the instrument has been researched on multiple occasions with different versions and a Cronbach's alpha of 0.81 to 0.83 has been reported ⁽³⁵⁾. In this study three different versions of the KIPPPPI were used; one for infants, one specially tailored for one-year-olds and one for two year old children. Each version addresses the child's health, behavior, emotional, social and cognitive development. Since responses to these items are provided by parents the resulting outcomes can to some extent be related to parental perception, especially considering socio-emotional behavior. Furthermore family burden is assessed through a series of questions on the perception of parenting and caretaking as well as the presence of certain stressors. In the baseline measurement this burden is assessed over the past two years. Stressors are related to psychological and physical health, conflict and financial matters in the nuclear and larger family. Apart from the presence of these stressors, parents are asked to indicate the level of concern these stressors caused to them. The response to the KIPPPPI can be classified into several constructs ⁽³⁵⁾. For the purpose of this study response to each measurement, although slightly different in number and wording of questions, were divided into two constructs: 'child behavior and development' and 'family burden', generating a Cronbach's alpha of .73 and .81 respectively. The construct of child behavior and development has a maximum of 116 points at baseline, 112 points at the first year measurement and 204 points at the final measurement. The construct of family burden has a maximum of 176, 108 and 112 points respectively. Through linear transformation all scales were made comparable with a maximum of 100 points. Elevated scores warrant concern in a family.

The final instrument for the parental evaluation is a brief Social Support questionnaire, containing 15 items addressing the level of support from spouse, family, friends, neighbors and professionals regarding parenting, household duties and personal issues, as well as the parental satisfaction regarding the received support. The questionnaire was designed based on several questionnaires addressing social support ⁽¹⁰⁾. Reliability of this particular questionnaire has not been investigated. In this study a Cronbach's alpha of .76 was found. We decided to present the entire questionnaire as a single construct where a maximum score of 68

points could be reached. An elevated score implies the presence of satisfying support.

Since information on scores obtained from a normal population are not available in the Netherlands for three of the four instruments used in the parental evaluation, a second control group was established at a later time to compare the scores after two years in our sample to those in a supposedly low-risk population. Out of the 4615 families that responded to our selection questionnaire but were not found to be at risk, a random sample of 400 families was approached. Of these families 13 turned out to have moved away. In the remaining 387 families the response was 63.6%. No reminder system was deployed to increase this percentage.

3.1.2 Health-related evaluations

The questionnaires for the general practitioners and the WBC-physicians were sent twice: at the children's age of one and two years. Both questionnaires were designed for this study. The general practitioner was asked about the number of contacts with each family, both face to face and by telephone, the physicians' concern about a family and the number of visits to the emergency room. Furthermore the general practitioner was asked about several diagnoses that may be indicative of child maltreatment. These are classified into 'injuries' (intoxications, burns, brain damage and other accidents or injuries) and worrisome diagnoses (such as dehydration, anemia, excessive crying, cystitis, diaper-dermatitis, nutritional problems and delayed growth). The WBC-physician was asked about the development of the child regarding motor skills and communication, about the physicians' concern about a family, and about parents keeping their appointments to the Well Baby Clinic. To establish possible bias in the judgment of physicians they were asked whether they knew in which group a family was randomized. General practitioners knew this in 1.8% of all families; WBC-physicians had this knowledge on a slightly larger portion of parents: 7.6%. As these percentages are small they will not be included in the analysis.

More information on health-related issues is derived from the family's medical consumption, addressed in the general information section of the parental measurements. First of all parents were asked to report the number of visits they paid to the emergency room with their index-child to enable verification with the reports of the general practitioner. Secondly they were asked to indicate their use of

other professional support. This support was divided into medical (such as hospital specialists, physiotherapy, speech therapy etcetera) or psychological support (such as psychotherapists, social workers and child rearing counselors).

Finally, data were obtained from the local Child Maltreatment Reporting Agency (*Advies en Meldpunt Kindermishandeling*, AMK) regarding the number of maltreatment reports they received and verified during the total of 3 years since the start of this study. Since there is no mandatory reporting law in the Netherlands neither large nor representative numbers of reports can be expected. Also, due to understaffing, there are waiting-lists for the verification of reports, which results in a further decline of the number of reports available to this study. Nevertheless, there are no alternative options for this type of data available. The AMK differentiates between reports made for the purpose of advice and for the purpose of intervention. Only reports for intervention are registered with the child's name. These reports were therefore the only ones that could be linked to our database. AMK data were group wise anonymized. Group division was based on the type of response received from parents (see figure 1). Reports made by the program's home visiting nurses were excluded to differentiate between intervention effects and 'natural course'.

This study was approved by the Ethics Committee of the Leiden University Medical Center.

3.2 Statistical procedures and analysis of data

Raw scores on all constructs used in the parental evaluations were treated as prescribed in the according scoring-manuals. To improve accuracy in case of missing response on a construct the method of proration was used. Each missing response was assigned a score equal to the mean item score for the particular construct. In case a manual did not provide a limitation of the number of missing responses allowed for a construct to still be considered valid, we applied a limit of 10% missing items per construct. As it turned out the proportion of families generating invalid constructs due to blanc responses did not exceed 4% of the sample on any of our measurements. In case of duplicate answers to an item or in case of a 'between-item'-response (where parents checked between two boxes

indicating they couldn't choose between two answers) consistently the more worrisome response was chosen in data processing.

In order to determine the effects of the intervention both groups of families are compared on a number of demographic variables. In case of scores on these variables the mean score and Standard Deviation (SD) are displayed, except for parental age where the range is indicated. In case of the presence or absence of a certain condition percentages are presented. To determine if scores or percentages in more than two groups differed significantly from each other a one-way analysis of variance with post-hoc Bonferroni-test (with $p < .05$) was used. In case of a two-group comparison this was done by means of an independent sample t-test.

Linear regression analysis was used to compute differences between the intervention group and the control group, separately for the results after one and two years and in both cases adjusted for baseline scores. Regression coefficient (B) and 95% confidence intervals are displayed. Significance of the regression coefficient occurs if the entire interval is either below or above zero. Using so-called dummy variables the interaction effects for subgroups of families were determined, again by means of linear regression analysis. The interaction effects indicate the difference found in the effect of the intervention for subgroups of families with either a high or low score on another variable. Regression was also deployed to determine the influence of the inclusion score, the amount of family burden and the time spent on home visits (variables found in the previous chapter) on the effects of the intervention.

To determine to what extent changes in scores on parental measurements due to the intervention could be considered clinically significant the Reliable Index of Change was calculated. This index was introduced by Jacobson and others ^(for example 29) and has later been refined by Hageman and Arrindell ⁽²⁵⁾ as the RC Index, utilizing improved pre-post difference scores (RCid). The Reliable Index of Change was designed to ensure that changes observed from pre- to post-test are reflecting "more than the fluctuations of an imprecise measuring instrument" ^(29, p14). The refinement by Hageman and Arrindell, the RCid, constitutes an adjustment for regression to the mean "in so far as the phenomenon is present and caused by measurement unreliability" ^(25, p700). The RCid presents an advantage for this study as it can be calculated without the use of the Standard Error of Measurement (SEM),

whereas the original index by Jacobson and others cannot. Calculation of the RCid requires the mean, standard deviation and reliability of scores (calculated using Guttman's reliability coefficients) of pre- and post scores as well as the Pearson correlation of pre- and post scores. For the exact formula see Hageman and Arrindell, 1993, pages 697 and 698 ⁽²⁵⁾. Application of the RCid results in a transformation of individual scores on a given construct. With the level of significance set at 5%, the absolute value of a transformed score has to exceed 1.96 (or -1.96) to conclude that some reliable change has occurred ⁽²⁵⁾. As such the RCid allows for a classification of clients into three categories: deteriorated, recovered and unchanged (or changed but not beyond the threshold of 1.96) ⁽²⁹⁾.

In this study the RCid has been calculated separately for the intervention group and for the control group, using their own parameters (such as standard deviation and reliability of scores). Outcomes are provided for all constructs investigated in this study and both for results after one and two years. Results on the RCid are simplified by omitting the proportion of families remaining unchanged on the index. Thus, only two out of three categories are presented.

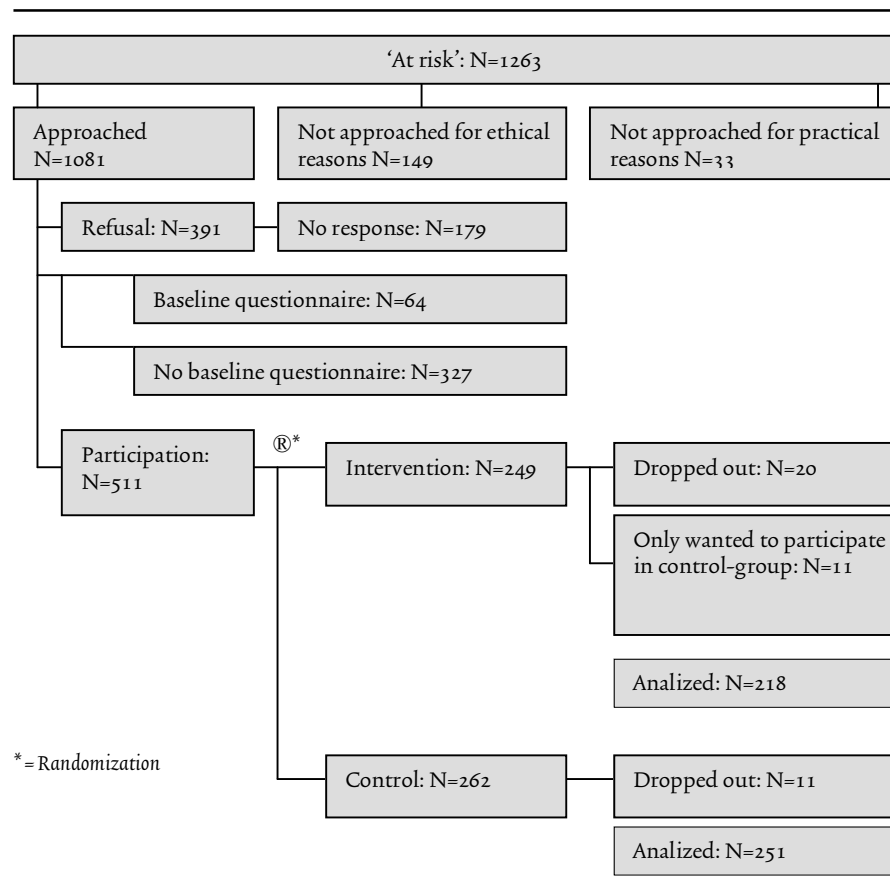
4 RESULTS

As is displayed in figure 1, 1263 in 8899 families were found to be at risk through the selection procedure (see chapter 5). Most of these families were approached for the home visitation program. Two groups of families were not approached; 33 families for practical reasons such as administrative errors or because the selection questionnaire was returned more than six months after the birth of the child. Another 149 families were not approached for ethical reasons: either parents explicitly denied participation on the selection questionnaire or a nurses' concern was expressed without a parental questionnaire being returned. In the latter cases sending out an invitation for the program was considered a substantial risk of damage to the relationship between a family and their Well Baby Clinic (WBC).

Upon approach, a total of 902 (391+511) families responded, 391 of which denied participation although 64 (16%) did fill out the baseline questionnaire. While families were approached by phone to set a first home visit date, 11 families indicated they wanted only to participate in the control-group. As this was considered selective participation these families were excluded from the program. Later analysis of this process revealed some administrative errors during selection resulting in a total of 20 families, equally divided over intervention- and control group, actually not being at risk for child maltreatment. These families are included in the analysis.

During the entire study 11 families from the control group and 20 families from the intervention group ceased to participate in the program. The majority (6 families from the control group and 19 families from the intervention group) did so before their child turned 1 year. Reasons for drop out of the intervention group are described in chapter 7. Of the families that ceased to participate in the control group five families felt the questionnaire was too extensive, two families moved outside the country and in one family the child passed away. The remaining 3 families failed to return their measurements with no known reason.

Figure 1. Sample composition



Eventually 218 families in the intervention group and 251 families in the control group were included in our analysis. Within this sample, five families from the intervention group and seven families from the control group returned their 2-year questionnaire but not their 1-year questionnaire, while seven families from the intervention group and fourteen families from the control group did the opposite. In table 1 the socio-demographic characteristics of our sample are presented, as well as those of the 'low-risk' group approached at two years. Comparison of the intervention group and the control group demonstrates that, with the exception of immigrant status for both parents and lower education for fathers, the intervention

group appears to hold a slightly more concerning population on all variables. These differences are however not significant with the exception of fathers' higher education level.

Table 1. *Sample characteristics.*

	Intervention	Controls	'Low risk'
N=	218	251	246
Inclusion score	2.2 (1.4)	2.0 (1.4)	0
Selected on mother	51.8%	51.8%	-
Selected on father	17.4%	20.7%	-
Selected on both parents	25.7%	23.5%	-
Parent(s) maltreated as child	61.0%	55.4%	-
Social isolation in family	27.5%	25.5%	-
Parent(s) dysphoria	44.5%	39.0%	-
Nurses' concern about family	14.7%	10.4%	-
Single parent family	10.6%	7.2%	0
Mother's age	31.6 (20-43)	32.4 (22-42)	32.8 (23-48)
Immigrant* mother	7.1%	10.7%	3.0%
Lower educated mother†	15.8%	13.2%	5.1%
Higher educated mother‡	32.6%	42.6%	45.5%
Father's age	34.1 (19-60)	35.3 (21-59)	35.4 (25-53)
Immigrant* father	7.2%	5.7%	1.7%
Lower educated father†	13.8%	16.7%	7.8%
Higher educated father‡	30.3%	44.2%	42.6%
Average number of children	1.7 (1-5)	1.8 (1-5)	2 (1-7)
First child	47.4%	42.6%	29.0%

* Immigrant: born outside western European countries, North America, Australia or New Zealand (for rationale see chapter 6).

† Lower education: lower general secondary education

‡ Higher education: college or university

Compared to the intervention group mothers in the 'low-risk' group are significantly older and less often lower educated, while fathers are also significantly older and less often of immigrant status. 'Low-risk' families have significantly more children than do families in the intervention group and the index-child is significantly less often a first child. When comparing low-risk families to the control group the pattern of significant differences diverges slightly from the intervention group: we found less lower educated mothers and less mothers of immigrant status, less lower educated fathers and less first children.

When comparing the intervention and control group to the other groups presented in figure 1, we found few significant differences. Amongst families that dropped

dropped out (N=31) significantly less immigrant fathers are found. Furthermore, families dropping out had a significantly higher average inclusion score of 3.0. Finally, amongst families that refused participation or failed to respond (N=570) we found significantly less dysphoric parents.

4.1 Evaluation of parental measurements

In table 2 all parental responses to the effect measurements are displayed. Average scores on baseline, first year and second year measurements for all scales are presented. Also regression coefficients for the intervention effect in each construct are shown. On the baseline measurement the control group scores slightly better than the intervention group does, which coincides with findings from table 1. Comparison to other groups of families as presented in figure 1 generates no significant differences with one exception: families refusing participation have significantly lower scores on the CAP.

Regression analysis shows some significant effects. Construct A of the AAPI (*expectations*) improved significantly ($p=.025$) during the intervention; however, this effect was lost at two years. The first construct of the KIPPI (*child development*) demonstrated a significant effect of the intervention in both measurements ($p=.036$ at 1 year and $p=.018$ at 2 years). Construct E of the AAPI (*non-oppressive parenting*) deteriorated in both measurements although deterioration was smaller after two years ($p=.019$ at 1 year and $p=.038$ at 2 years). Comparison of both measurements shows small differences. Furthermore, an analysis of interaction effects generated two significant findings regarding constructs of the AAPI. We found that the intervention significantly improved scores on construct B (*empathy*) in families with a higher risk of maltreatment (CAP scores ≥ 80 ; $B = .90$, $p=.012$), and on construct C (*punishment*) in families with a higher burden score (Family Burden ≥ 16 ; $B = .63$, $p=.032$; data not shown in table 2). Finally, in the intervention group 23 families (11.0%) reported the birth of a new child in their family after they started participation, versus 39 families (17%) in the control group (data not shown in table 2). This difference is approaching significance ($p=.088$).

A closer analysis of the effects of the intervention after two years, whereby baseline scores were categorized into tertiles, resulted in the following significant findings regarding the construct of social support. First of all social support seemed to

improve most through the intervention (though not significant) in families with either very little support or very much support at baseline when compared to the control group. However, in families with an average amount of support the intervention generated a reverse effect: support decreased significantly ($B = -4.04$, $p = .030$) compared to the control group. Thus, the effects of the intervention seem to describe a u-form regarding this construct. Second, the intervention had an almost significantly positive effect in families that started out with high spousal support ($B = 3.0$, $p = .057$). With these findings a closer examination of the results on the social support scale was conducted. We found that in both the intervention group as well as in the control group, the number of supportive resources decreased over time along with the satisfaction experienced about these different supportive resources. In the intervention group this decrease was however significantly smaller regarding the support from the spouse when compared to the control group, as was determined by an independent sample t-test ($p = .031$; further data not shown).

In the previous chapter three variables were assumed to influence the effect of the intervention: the family's inclusion score, the amount of family burden and the amount of time spent during the home visits. However, regression analysis within subgroups of families marked either low or high on these variables demonstrated no significant effects.

Table 2. Scores on parental measurements and regression analysis of intervention effect at 1 and 2 years, controlled for baseline (Ni=218, Nc=251)

		Baseline		B ₁ [*]	95% CI ₁ [*]		B ₂ [†]	95% CI ₂ [†]	
		Mean (SD)	1 Year		lower	upper		lower	upper
Appropriate expectations (AAPI A)	I	6.3 (1.9)	6.5 (1.5)	.266	.03	.50	.148	-.10	.40
	C	6.4 (1.9)	6.3 (1.5)						
Empathic awareness (AAPI B)	I	5.7 (1.8)	6.1 (2.0)	.076	-.22	.37	.117	-.19	.43
	C	5.7 (1.7)	6.0 (1.9)						
Values alternatives to Corporal punishment (AAPI C)	I	5.7 (1.2)	6.0 (1.3)	.081	-.14	.30	.047	-.19	.28
	C	5.8 (1.3)	5.9 (1.4)						
Appropriate family roles (no role reversal) (AAPI D)	I	5.7 (1.6)	7.1 (1.6)	.023	-.22	.27	.117	-.09	.44
	C	5.7 (1.6)	7.0 (1.7)						
Non-oppressive to. Childs' power & independence (AAPI E)	I	5.4 (2.3)	3.5 (1.8)	-.412	-.75	-.07	-.361	-.70	-.02
	C	5.5 (2.4)	3.9 (1.9)						
Worrisome child development (KIPPPPI)	I	11.1 (9.2)	5.1 (4.9)	-1.059	-2.05	-.07	-1.379	-2.52	-.24
	C	10.2 (8.0)	6.1 (6.1)						
Family Burden (KIPPPPI)	I	10.3 (8.6)	5.7 (5.6)	.331	-.58	1.25	.009	-1.01	1.03
	C	8.6 (7.9)	5.1 (5.1)						
Family's Social Support	I	42.9 (10.0)	41.3 (10.1)	.324	-1.12	1.77	.223	-1.33	1.78
	C	42.3 (9.5)	40.2 (9.0)						
Child Abuse Potential (CAP)	I	84.8 (66.3)	75.6 (65.0)	-.830	-8.91	7.25	-2.605	-10.92	5.71
	C	74.2 (56.9)	69.6 (55.7)						

* Difference between intervention group & control group controlled for baseline (regression coefficient) and 95% confidence interval at 1 year

† Difference between intervention group & control group controlled for baseline (regression coefficient) and 95% confidence interval at 2 years

Nota Bene: Higher scores on constructs of the AAPI and on Family's social support are considered improvement, in the KIPPPPI and the CAP lower scores are considered improvement.

The next step in our evaluation of parental measurements is the comparison of scores of families in the 'low-risk' second control group at two years to those found in the intervention group and the control group. This is done in table 3, presenting the mean scores and standard deviations found in the 'low risk' group, combined with the significance of this comparison through one-way ANOVA. Following our findings presented above, families in the intervention group do not differ from low-risk families on the outcome of child development (KIPPPPI) while families in the control group do. On family burden (KIPPPPI), social support and Child Abuse Potential (CAP) our sample still differs from the low-risk population. Regarding scores on all AAPI constructs, no differences between groups are found.

Table 3. Scores in 'low-risk' second control group (N=246) at 2 years and significance of comparison to Intervention (I) and Control group (C) through one-way ANOVA.

	'Low-risk' group Mean (SD)	ANOVA vs. I	ANOVA vs. C
Appropriate expectations (AAPI A)	6.2 (1.4)	1.0	.477
Empathic awareness (AAPI B)	6.0 (1.9)	1.0	1.0
Values alternatives to Corporal punishment (AAPI C)	6.0 (1.4)	1.0	1.0
Appropriate family roles (no role reversal) (AAPI D)	7.0 (1.3)	.249	1.0
Non-oppressive towards children's power & independence (AAPI E)	3.9 (1.8)	.469	1.0
Worrisome child development (KIPPPPI)	6.1 (5.6)	.305	.000
Family Burden (KIPPPPI)	2.3 (3.2)	.000	.000
Family's Social Support	46.6 (9.5)	.000	.000
Child Abuse Potential (CAP)	32.7 (25.8)	.000	.000

4.1.1 Clinical significance of parental measurements

Since the effects for the intervention found through regression analysis were small we decided that it was important to calculate the percentage of families in whom effects were clinically significant. For this purpose the reliable index of change (RCid) was calculated. Positive change in families is considered significant if this index is larger than 1.96. Results are presented in table 4.

Table 4. Improvement and deterioration (%) on the reliable index of change RCid after 1 and 2 years.

		Results after 1 year			Results after 2 years		
		Impr.	p	Deter.	p	Impr.	p
Appropriate expectations (AAPI A)	I	18.0%	.970	21.3%	.730	19.3%	.038
	C	17.9%		20.0%		12.1%	20.8%
Empathic awareness (AAPI B)	I	23.6%	.217	26.0%	.215	23.3%	16.7%
	C	28.8%		31.3%		21.3%	15.2%
Values alternatives to Corporal punishment (AAPI C)	I	11.0%	.162	7.7%	.722	13.9%	11.1%
	C	7.2%		6.8%		13.9%	10.8%
Appropriate family roles (no role reversal) (AAPI D)	I	37.3%	.805	4.8%	.328	48.1%	10.5%
	C	38.5%		3.0%		39.7%	12.9%
Non-oppressive towards children's power & indep. (AAPI E)	I	40.6%	.437	39.1%	.584	55.1%	44.9%
	C	44.3%		36.6%		50.9%	49.1%
Child development (KIPPP1)	I	32.2%	.000	1.5%	.066	9.0%	10.9%
	C	16.6%		0%		0.9%	15.9%
Family Burden (KIPPP1)	I	33.5%	.182	0%	-	38.3%	0%
	C	27.6%		0%		31.3%	0.4%
Family's Social Support	I	2.2%	.122	6.5%	.077	1.1%	4.8%
	C	5.1%		11.6%		5.2%	17.9%
Decreased Child Abuse Potential (CAP)	I	18.2%	.003	10.8%	.070	22.0%	10.0%
	C	8.6%		6.0%		8.1%	7.2%

Positive change after two years was achieved significantly more often in the intervention group compared to the control group in three constructs (AAPI A, *expectations*, KIPPPi, *child development* and CAP) and approached significance in AAPI D, *family roles*. Family Social Support improved significantly more often in the control group after two years, but it also deteriorated significantly more often in this group, when compared to the intervention group. Interestingly, when comparing the results from 1 and 2 years, in the intervention group the percentage of positive change increased on 6 out of 9 constructs, while this percentage decreased in 4 out of 9 constructs in the control group.

Positive change in at least 6 out of 9 constructs as presented in table 4 was found after two years in 10.0% of the control group as opposed to 18.3% of the intervention group. This difference is significant ($p=.009$). Interestingly, when comparing these ‘successful families’ in the intervention group to the remaining families in the intervention group we found that these parents almost significantly more often participated with their first child ($p=.051$) and furthermore that these parents presented significantly more worrisome baseline scores on the KIPPPi constructs *child development* ($p=.007$) and *family burden* ($p=.001$).

4.2 Health-related evaluations

Response on the questionnaires for general practitioners and WBC-physicians was high. After the first year, 88% of the general practitioners and 99% of the WBC-physicians responded. After the second year, 85% response was received from both physicians. Overall, 79% of the general practitioners and 84% of the WBC-physicians filled out both questionnaires. The results of the combined responses of general practitioner and WBC-physician on both measurements are displayed in table 5, along with parental reports on visits to the Emergency Room (ER) and ‘medical consumption’ (including the use of professional psychological care).

Again some significant differences between intervention group and control group are found in this analysis. The lower number of face to face contacts to the general practitioner in the intervention group approaches significance ($p=.098$). Families in the intervention group were significantly more punctual in keeping their appointments to the Well Baby Clinic ($p<.05$). Also, families in the intervention group needed significantly less specific medical care ($p<.05$) and had significantly more ($p<.01$)

psychological professional support. This is in spite the fact that there are no significant between-group differences in referrals made by both the general practitioner and the WBC-physician (data not shown).

Table 5. Combined physicians' report on family contact, concern and assessment as well as parental report on ER-visits and consumption of professional care.

	Intervention (SD)	Controls (SD)	β	95% CI	
				low	up
General practitioner report	N=151	N=169			
Concern about family	20.5%	19.5%	.027	-.09	.14
Face to face contacts	6.1 (5.4)	7.2 (6.6)	-1.143	-2.50	.21
Phone contacts	2.0 (2.9)	2.1 (5.5)	-.081	-1.14	.98
Mean of injury-related diagnoses	.23 (.52)	.20 (.47)	-.031	-.08	.14
Mean of other worrisome diagnoses	.48 (.73)	.50 (.98)	-.022	-.23	.18
Mean of ER visits	.60 (.94)	.59 (.95)	-.043	-.20	.21
Actual ER visits	49 (32.4%)	52 (30.8%)			
WBC-physician report	N=160	N=179			
Family keeps appointments	98.0%	93.5%	.045	.00	.09
Child development worrisome	13.1%	18.4%	-.053	-.13	.02
Support indicated	37.3%	30.3%	.070	-.03	.17
Parental reports	N=218	N=251			
Mean of ER visits	.34 (.92)	.32 (.67)	.025	-.15	.20
Actual ER visits	23 (10.5%)	26 (10.3%)			
Medical care	21.7%	31.2%	-.109	-.22	-.00
Psychological care	33.2%	19.6%	.220	.11	.33
No extra care	51.6%	53.5%	-.028	-.12	.06

Regarding the comparison of reported visits to the emergency room, in the intervention group 37 parents did not report these visits and general practitioners did not know about 12 families visiting the ER. In the control group 39 parents did not report their visits whereas general practitioners were uninformed about the visits of 16 families. Combined reports of ER visits show the same nonsignificant differences as are displayed in table 5.

In table 6 the reports on suspected child maltreatment per response group, following figure 1, are presented together with the percentage of children per group that is reported with several exceptions. First, groups in which no reports were made are omitted from table 6. Second, as part of the families dropping out of this study moved to other parts of the Netherlands no information could be obtained on possible reports

about these families. Therefore this group is omitted as well. Finally, as was discussed in the methods section, reports by the home visiting nurses are also omitted from table 6. Two families were reported to the AMK by the visiting nurses at completion of the program.

Table 6. Verified reports of child maltreatment in groups of families.

Families	Reports	
	N	%
Intervention group (N=218)	1	0.5
Control group (N=251)	2	0.8
Refused participation to the program (N=327)	1	0.3
Did not respond to the invitation for participation (N=179)	5	2.8
Not approached for ethical reasons (N=149)	6	4.0
Total number of reports in families at risk (N=1263)	15	1.2

Through one-way ANOVA several significant differences between these groups were found. Families that were not approached for ethical reasons are significantly more often reported than families in the control group ($p=.002$), families that refused participation ($p=.000$) and almost significantly more often than families in the intervention group ($p=.057$). Furthermore, families that refused participation were significantly more often reported than families that did not respond to the invitation for participation ($p=.024$).

Against the background of this entire study other group-divisions have also been studied. First of all three categories are made to compare families at risk to those that were considered 'low risk' and those that did not respond to our selection questionnaire. Amongst 'low-risk' families (N=3757) 5 verified reports were filed (0.1%), amongst non-respondent families (N=3880) 29 verified reports were filed (0.7%). Comparison through one-way ANOVA demonstrates significant differences ($p<.01$) between all three categories. Secondly we found that 4 of the families about whom a nurses' concern was registered (N=306) were reported (1.3%), whereas about families without a nurses' concern (N=6829) only one report was filed (0.02%). Finally, when considering the origin of selection, in families that were selected based on mother's score 9 in 710 families were reported (1.3%) while in families selected based on father's score 2 in 300 families were reported (0.7%). In families that were selected based on both parents 7 in 304 families were reported (2.3%), which is significantly more ($p=.050$) than in families that were selected based on father's score.

5 DISCUSSION

This randomized controlled trial resulted in several positive effects. Statistically significant improvements during the intervention were realized regarding *parental expectations* (AAPI A) and *child development* (KIPPPPI). The latter of these improvements was maintained after the intervention was completed. On this construct (KIPPPPI -*child development*-) we also found that home visited families no longer differed from 'low-risk' families at two years. Clinically significant changes through the Reliable Index of Change demonstrated improvement in 1% - 55% of all families visited. These improvements were significantly larger than those in the control group in three constructs (*Child Abuse Potential*-CAP-, *Child development*-KIPPPPI- and *Parental expectations*-AAPI A-). Clinically significant positive change in six or more out of nine constructs was found almost twice as often in the intervention group compared to the control group, a significant difference. Over time clinically significant positive change increased in two-third of the constructs due to the intervention, while without the home visits positive change decreased in almost half the constructs. Through the health-related evaluation we found that families in the intervention group had established connections to professional psychological support sources significantly more often than did families in the control group. Finally we found slightly more reports about suspected child maltreatment in families in the control group when reports by the program's nurses were excluded. Reports in the intervention group increased by 200% (from 1 to 3) when including those made by the visiting nurses, suggesting that the program improves the early recognition of maltreatment.

A closer analysis of separate parameters has provided several interesting findings. First of all it should be considered encouraging that the intervention caused a particular improvement of parental *empathy* (AAPI B) in families at a high risk for maltreatment. As low levels of empathy are found to reflect a greater likelihood of maltreatment (¹⁷) inversely one might reason that improvement of empathy could serve as a buffer against the risk for maltreatment. Secondly the intervention appeared to result in a better appreciation of non-physical punishment methods, particularly in families with a high level of burden (KIPPPPI). As both family stressors and a positive attitude with regards to physical punishment can increase the risk for maltreatment (^{9; 33}) the accomplished shift in attitude towards physical

punishment in this particular group of families could constitute an important protective coping skill in stressful situations (^{see 28}). Furthermore it is worth mentioning that we found fewer subsequent births in families in the intervention group compared to the control group, a difference approaching significance. Small time-spacing between children is considered to increase the risk for child maltreatment (¹¹). This finding is reported by Olds, Henderson, Kitzman, Eckenrode, Cole and Tatelbaum (1999) as well, as part of their long-term findings (⁴⁵), which suggests that the differences found in our study on this particular outcome may increase over time.

We found a reversed effect of the intervention on the AAPI construct *non-oppressive parenting* (AAPI E) in both measurements. This construct is considered the weakest of all five AAPI constructs (³⁰) according to the designers of the instrument, which is confirmed by the lower Cronbach's alpha (.50) found in our study for this construct. A closer examination of this particular construct demonstrates that the individual items (i.e. *Children who learn to recognize feelings in others are more successful in life* or *Parents who are sensitive to their children's feelings and moods often spoil them*) seem to entail more than the construct suggests to be measuring. Parents scoring low on this particular construct are supposed to "view children with power as threatening and are expecting strict obedience to their demands" (^{3 scoring sheet}). Perhaps these types of questions are more difficult to answer as parents cannot envision the consequences of the described behavior. The fact that even scores found in the 'low risk' second control group are within the worrisome range (below 4) suggests that other influences may be at play concerning this construct. These influences may be related to cultural differences between the Netherlands and the country of origin of the instrument (United States). They may also be related to the timing of our measurements, as children go through a difficult phase around this time and tend to increasingly challenge their parents.

Results from the Social Support questionnaire demonstrated that the improvement of the social support system hinges on the quality of spousal support. This is consistent with the conclusions of Belsky (1981) about the crucial role of spousal support (²) and confirms the notion that this source of support should be an important focus in future interventions. As for the general lack of improvement caused by the intervention, intuitively it makes sense that encouraging families to

restore and enlarge their social network may result in initial social commotion before generating positive results. Also, the quality of a social support network is likely to change, particularly after the birth of a first child. The fact that the intervention caused support to improve in families scoring either high or low at the baseline while at the same time causing a decrease for families scoring average at the baseline when compared to the control group was puzzling. Possibly the intervention has caused a re-evaluation of the available support in this group, resulting in lower scores on consecutive measurements. Either way, further research is necessary on this subject.

Regarding the health-related evaluation we found no differences between groups for maltreatment-related diagnoses or visits to the emergency room. A number of preventive studies used these parameters as outcome, however only few of them found significant differences (^{see 21; 37}). Olds, Henderson, Chamberlin and Tatelbaum (1986) did find significant differences, particularly for babies of poor, unmarried teenagers (⁴⁴). These findings suggest that we may find significant differences in subgroups of participating families, a topic for future research. Interestingly, our intervention resulted in significantly more punctual WBC-visits, a result aimed for by a number of studies but rarely reported (^{see 21}). The most robust results of programs that aim to prevent child maltreatment are to be measured through the number of maltreatment reports. As maltreatment is a relatively rare event in the population (at least 23 in each 1000 children are supposedly maltreated each year in the Netherlands (^{based on 49})), large numbers of participants are necessary to demonstrate significant changes in the rate of occurrence of maltreatment (²¹). In addition, in the Netherlands the number of reports to be expected is even lower due to a lack of mandatory reporting laws. Also, it should be considered that only 27% of all reports are about children age 3 or younger (the age-group in our sample) (⁵¹), which may be related to the fact that 52.5% of all reports are made by schools and (mental) health-care institutions to which children below three years of age are less visible (⁵⁰). As a result of these limitations only cautious conclusions can be drawn from the small numbers of reports found in this study.

When considering our sample of participants, two conclusions can be drawn. First, 47% of all at-risk families approached agreed to participation. This percentage may

be low compared to enrollment proportions in other studies (75-90%), retainment on the other hand was very high (92% versus percentages ranging from 33 to 80) ⁽²¹⁾. As far as could be determined based on the baseline questionnaires returned by 16% of the refusing families, those families that declined participation to the program did not differ significantly from participants, suggesting that enrollment bias was small. Families that did not complete the program had a significantly higher number of risk factors than those that remained in the program, although no significant differences were found on the baseline measurement. Secondly, a large amount of our outcomes was based on parental self-reported parameters. Therefore we have to consider the possibility of bias ^(14; 47). The likelihood of bias is largest in the intervention group, as the home visits through their very purpose have probably made parents more aware of a number of issues that are particularly addressed in the selected measurements. Furthermore, bias due to the so-called Hawthorne effect as well as 'subject bias' may have occurred (see also chapter 7). However, bias in the control group may also have occurred due to the so called test-effect. In fact, several parents reported in their consecutive measurements that 'even answering the questions in these measurements had made them think about their parenting behavior and role'. All things considered the presence of bias is conceivable in our study but the direction and consequences of this bias are difficult to establish.

For the evaluation of preventive programs there are literally dozens of instruments to choose from. In this study four instruments were chosen in relation to the program objectives. Ideally a prevention program should generate the following cascading set of parental reactions ⁽²¹⁾: improved knowledge and skills in parents should enhance perception and expectations and thereby promote empathic and sensitive parenting, thus decreasing the risk of maltreatment. In this study particularly the KIPPI and the AAPI helped confirm this cascading pattern to a certain point, although a significant decrease in the risk of maltreatment (CAP) could not be obtained. Two of the instruments used in this study generated unexpected results: the Social Support questionnaire (as addressed above) and the CAP. A recent publication by Chaffin and Valle (2003) suggested that, although the CAP has a high static predictive validity, the dynamic predictive validity is less well supported ⁽¹²⁾. This may be related to the fact that part of the characteristics addressed in the CAP, such as parental personality traits and the adult's own

childhood history of maltreatment, tend to be relatively stable characteristics and are therefore difficult to change by an intervention ⁽³⁹⁾. Consequentially the RCid was applied (as suggested by Milner ⁽⁴¹⁾) , not only to the CAP but also, since the modified RCid made this possible, to the other constructs used in this study.

We conclude that this program is a modest success. The findings of relatively small effect sizes are consistent with those of other studies addressing populations of high-risk families ^(23; 24). Timing may be a factor in the size of our findings as it is unclear which ‘time horizon’ is best in establishing effects of an intervention ⁽²³⁾. The dosage of this intervention may also be related to the effect sizes found although findings on the ideal dosage for an intervention remain unclear ^(23; 36). A clinically significant reduction of the risk for maltreatment was realized in almost a quarter of the intervention group. Similar reductions were found in the constructs AAPI A (*expectations*) and KIPPI (*child development*). A partial success was achieved regarding the improvement of support through the intervention. When comparing scores in our sample to a supposed ‘low risk’ sample at two years we found that scores in both the intervention and control group were still significantly more worrisome regarding *family burden* (KIPPI), *social support* and *child maltreatment potential* (CAP). This finding suggests that there is still a long way to go for our study sample. However, the significant amount of professional (psychological) support realized in the intervention group through the nurses’ referrals, combined with the finding that clinically significant positive change in two third of the constructs used in this study increased between one and two years, could provide an indication that effects may grow over time. This would be consistent with other studies demonstrating a strengthening of program gains over time ^(see 15; 36). Follow-up of our study sample is necessary to determine such outcomes.

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