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## **IMPACT OF THE NURSING HOME VISIT TO THE NEWBORN/INFANT/FAMILY: A SYSTEMATIC REVIEW OF THE LITERATURE**

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## ABSTRACT

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**Objective:** To identify the impact of the home visit to the newborn/infant/family, when performed by nurses, on the health and well-being of the child and family.

**Methodology:** A systematic review of the literature was carried out following the Joanna Briggs Institute methodology, based on a research on the EBSCO and pubmed platform, and bibliographical references of the articles found, with the chronological frieze 2010 and 2017. Were included Randomized controlled trials evaluating the impact of the home visit of nursing performed when they were newborns/infants, in the health and well-being of the child and family, in children/adolescents/families.

**Results:** We selected 11 articles, randomized controlled trials, 7 experimental and 4 follow-up. The data systematization process was carried out using tables that facilitated the analysis of the studies. We have found studies that evaluate the impact of the home visit to the newborn/infant/family in the short (2) and long (9) term, developed with great heterogeneity in the intervention of the home visit performed and evaluated impacts, but the results show gains in the well-being of children and families.

**Conclusions:** It is evident from the results found that the home visit of the newborn/infant/family, performed by nurses, has a positive impact on the health and well-being of the child and the family.

**Keywords:** Nursing home visit; newborn/infant/family; child/family health and well-being; systematic review of the literature.

## INTRODUCTION

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The early childhood development is the essential foundation for success in many areas of life, such as physical well-being, literacy skills, criminality and social and economic involvement throughout life. What happens to the child in his/hers first years is crucial to the development and to the child's life cycle<sup>(1)</sup>.

The children's health and development outcomes depend primarily on the ability of families to provide a safe environment for their infants and young children. Unfortunately, many families have insufficient knowledge about parenting skills and an inadequate support system of friends, extended family or professionals to help or advise them to take care of their children<sup>(2)</sup>. The postpartum period is a period of meaningful physiological and psychological stress, due to the imposition of new learning, consolidation of family identity and establishment of new affective bonds<sup>(3)</sup>.

The home visit (VD) to families is an early intervention strategy in many industrialized nations and it's free of charge, voluntary and integrated into the comprehensive maternal and child health system. It is deeply rooted in history, with references to Elizabethan times in England and adopted as a Florence Nightingale strategy in the nineteenth century. In the last quarter of the 20th century, it was increasingly used as a strategy to prevent child abuse and neglect, parental efficiency and reduction of health disparities<sup>(2)</sup>.

A HV can provide a variety of support for families to achieve certain results, such as, establishing strong relationships between parents and their children, safer and more stimulating home environments for children and, consequently, child well-being and educational achievement. Home visiting services can also promote parents' knowledge of the child's development, the parents' well-being and family self-reliance<sup>(4)</sup>. Home intervention offers more opportunities to promote family involvement, personalized service, individual attention and relationship building<sup>(5)</sup>.

Involving families in HV programs during the prenatal or early infancy, most of them being involved until the end of the infant age, means that the children's long-term development will improve. These will promote parental skills, social support, problem management and access to community and health services<sup>(6)</sup>.

International guidelines reinforce the need for postpartum care and follow-up. The HV to the newborn and his family is defended by the World Health Organization (WHO) and by UNICEF in the joint statement, stating that the mother and the newborn (NB) need attention in the period immediately after birth and state also that studies show that home-based care interventions can avoid between 30 and 60 percent of neonatal deaths in environments where mortality is high<sup>(7)</sup>.

The term HV is used differently in a variety of contexts. It may refer to an evidence-based strategy in which a professional or paraprofessional (layman trained but not licensed) provides a service in a community or private home. HV also refers to the variety of programs that use domestic visitors (community members) as way to make the service comprehensive<sup>(8)</sup>.

According to Martín "The nurse is the health professional with the best conditions to develop his work in direct contact with the community, to value the family environment, the relationship between parents and newborns from the first moment (...) the nurse knows how to evaluate and how to act about harmful or beneficial environmental factors surrounding the child and how to reduce or reinforce them in the second."<sup>(9)</sup>.

The HV is a strategy that allows the approach to the home of the patient and his family allowing health professionals, in this case nurses, to know their physical and psychosocial environment<sup>(10)</sup>. When transition situations occur in people's life, "nurses are the primary caregivers of the client/family and are mindful of the changes and impact on their lives, helping them in the transition process through learning and skills acquisition."<sup>(11)</sup>.

According to the Order of Nurses' statutes, the award of the professional title of nurse recognises scientific, technical and human competence for the provision of general nursing care to the individual, the family and the community, at different levels of prevention, included the HV<sup>(12)</sup>. It recognises to the specialist nurse scientific, technical and human competence to provide, in addition to general care, nursing care specialized in the clinical area of its speciality<sup>(13)</sup>. Each specialist nurse has different goals, regarding the accomplishment of HV to the puerperium and new-born. This is, considering specific competences of Nurses specializing in maternal and obstetric health nursing and child and paediatric health, the home visit to the puerperium and to the NB, can be different according to the nurse's sphere of action within the scope of family health<sup>(14)</sup>.

The HV efficacy performed by nurses to improve maternal and child health and well-being outcomes has been previously reported in international studies and systematic reviews. However, despite this evidence, in the most recent findings most of the systematic reviews found a generalised intervention (nurses, paraprofessionals and domestic visitors) and the benefits of the it.

We verified with the research carried out, that in Portugal there is not a great investment in the implementation of this practice of care. In analysing this evidence, we propose to carry out this systematic review that aims to identify existing literature that demonstrates the impact of the home visit to the new-born/infant and family, when performed by nurses on the health and well-being of the child and family.

## METHODOLOGY

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To identify and systematize the best evidence on the subject, we use the principles of a Systematic Review of Literature for descriptive analysis. The systematic reviews aim to analyse the feasibility, adequacy, meaning and efficiency of health care interventions<sup>(15)</sup>. This review followed the outlined methodology in the Joanna Briggs Institute Reviewers' Handbook.

Considering the defined objective, the PICOS strategy was used to elaborate the starting point and to define the inclusion and exclusion criteria in the selection of articles. It was defined as P – New-born/infant and family, I – Nursing home visit, C – Absence of home visit, home visit by other technicians or different methodologies for a nursing home visit, O – Impact on the health and well-being of child and family, S – Clinical Trials with randomized control, establishing itself as a starting question: What is the impact of the home visit to the new-born/infant and family on the health or well-being of the child and family?

A research strategy was used to identify the articles in three steps. A search was performed initially on the online bases platform, EBSCO and Pubmed, during December 2017. Starting with the descriptor MeSH Browser, we organized keywords adding the Boolean operators AND and OR, being: Home Visit AND Nurse AND New-born, and Home Visit AND Nurse OR Home Nursing OR Home Visitation AND New-born OR Infant AND Family, and Home Visit AND Nurse AND New-born OR Infant AND Impact AND Child well-being OR Child health OR Parenting, and Home Nursing AND Impact AND Child well-being and Home Nursing AND Impact AND Child health and Home Nursing AND Impact AND Parenting. Subsequently, the bibliographical references of all identified articles were analysed to identify additional studies. Finally, a new database search was carried out with the keywords Nurse AND Family AND Partnership. Written studies in English and freely available in PDF (free full text) were included in this literature review. The research strategy covered a period between January 2010 and December 2017.

The criteria for inclusion were defined as articles in which the type of participants were children and families who were visited by nursing home visit when they were new-born/infants, where the type of intervention/phenomenon of interest is the home visit of nursing, the type of outcome is the impact on the health or well-being of the child and family, and that the type of study is a clinical randomized controlled trial. Exclusion cri-

teria were considered articles in which Outcomes focused only on a specific area of health and well-being of the child and family.

The quality of the studies was analysed by two reviewers, according to the MASTARI scale critical appraisal tools Randomized Control/Pseudo-randomized Trial of Joanna Briggs Institute Reviewers' Handbook<sup>(15)</sup>.

## RESULTS

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According to the strategy defined, the research carried out in the databases resulted in 126 potentially relevant articles in EBSCO and 58 in PUBMED. 12 were excluded because they were duplicates. The titles were read, and the inclusion criteria defined. The results were obtained after this selection: 24 articles in EBSCO and 31 in PUBMED. Subsequently, the abstracts were read, with 33 articles being analysed in their entirety, the rest being excluded because they were systematic reviews and not included in the inclusion criteria. Eight studies identified in bibliographic references of these works were also analysed in their entirety. After this analysis and in accordance with the inclusion and exclusion criteria initially defined, 9 studies were selected from the databases and 2 from bibliographic references of the articles analysed, which are part of this review.

The data extraction and synthesis process was performed using a table that facilitated the analysis of the studies, which include the following aspects: study identification, country and date, study objective, study design, number and type of participants, results and main conclusions.

The studies analysed were developed in different countries and are distributed as follows: United States of América (USA) (7 studies), Australia, Iran, Netherlands and United Kingdom (1 study each).

Regarding the methodological approach of the analysed studies, of the total of the eleven studies found all present quantitative methodology and are randomized controlled studies, seven Experimental and four follow-ups.

The sample of the studies consists of child/youngsters and families who were visited by nursing home visits when they were new-borns/infants. We found studies that evaluate the impact of HV to the NB/Infant/Family, in the short and long term (nine). From the studies found, nine evaluate the impact of HV performed by nurses on the well-being of child and family (six) and only the well-being of children (five).

In order to better understand and visualize the obtained results, three tables were prepared, which present the characteristics of the selected studies according to author and year of achievement, country of origin, sample, design and purpose of the study, type of intervention and results. These were grouped according to the type of intervention, namely, HV performed by nurses and by other professionals (table 1), HV performed by nurses according with the program Nurse-Family Partnership (table 2) and HV held by Nurses (table 3).

Table 1 – Methodological characteristics of the selected studies and main results.  
(HV carried out by nurses and other professionals).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Meghea C, Zhu B, Raffo J, et al. Infant health effects of a nurse community health worker home visitation programme: a randomized controlled trial. (E16) (2012)	USA	613 pregnant women and NB, underprivileged and young, 307 intervention group and 306 control group.	<ul style="list-style-type: none"><li>- Quantitative Study</li><li>- Almost Experimental</li><li>- Randomized controlled trial</li><li>- Evaluation at 12 months with interviews and questionnaires and consultation of children's health records.</li></ul>	To test whether children to whom HV was performed by a team of nurses and community health workers had better health outcomes in the first 12 months of life than children in the HV group held only by nurses.	Women in the control group received an average of 8 HV of nursing, (five postnatal), while the intervention group received an average of 24 HV of nursing and community workers (13 postnatal) during the intervention.
Results	<ul style="list-style-type: none"><li>- Intervention with community health workers did not improve overall child health from the mother's perspective and did not offer additional advantages in improving specific health outcomes for children, including childhood illness and immunizations, and reduced hospitalization and visits to emergency services. It also had no stronger effects on the health of children born to mothers with low psychosocial resources and stressful situations.</li></ul>				
Olds D, Holmberg J, Donelan-McCall N, et al. Effects of Home Visits by Paraprofessionals and by Nurses on Children: Age-Six and Nine Follow-Up of a Randomized Trial. (E17) (2014)	USA	735 pregnant women and NB, low economic resources, 255 in group 1, 245 in group 2 and 235 in group 3.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Follow-up</li><li>- Randomized controlled trial</li><li>- Evaluation at 6 and 9 years with interviews, observations and behavioral psychological tests and questionnaires of mothers and teachers.</li></ul>	To examine the impact of prenatal and child / child home visits performed by paraprofessionals and nurses according to the program Nurse Family Partnership (NFP) program on child development in children aged 6 and 9 years.	Group 1 received free child development screening and referral up to 24 months of age. The women in group 2 and 3 received the care offered to group 1 and HV performed by paraprofessional (group 2) and nurses (group 3) during pregnancy and the first 2 years of the child's life.
Results	<ul style="list-style-type: none"><li>- In the intervention performed by paraprofessionals there were no significant statistical effects on the emotional/behavioral problems, but the children born of mothers with few psychological resources, however, presented less errors in the visual attention/change of tasks at the age of 9 years.</li><li>- Children visited by nurses had fewer total emotional/behavioral problems at 6 years, psychiatric disorders and attention deficits at age 9. Children born to low-resource mothers had a better average language index at 2, 4 and 6 years and sustained attention at 4, 6 and 9 years. There were no significant effects on the problems of aggressive behavior, intellectual functioning and academic performance.</li></ul>				



Table 2 – Methodological characteristics of the selected studies and main results.  
(HV performed by nurses according to the Nurse Family Partnership program).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Kitzman H, Olds D, Cole R, et al. Enduring Effects of Prenatal and Infancy Home Visiting by Nurses on Children. <sup>(E3)</sup> (2010)	USA	First-born children aged 12 years (N = 613) children of mostly economically underprivileged African American women (N = 743 randomized during pregnancy).	<ul style="list-style-type: none"><li>- Quantitative Study</li><li>- Randomized trial controlled</li><li>- Follow-up</li><li>- Evaluation at 12 years of age with interviewsto the mothers and children, application of evaluation scales and assess behaviour. Consultation of child's health records.</li></ul>	To test the effect of pre-natal and infant HV performed by nurses, on substance use, behavioral adjustment and academic achievement in 12 years children.	<p>The women in the intervention group received the same services as those in the control group, in addition to the pre-natal (7) and post-natal (26) HV until the child's second birthday.</p> <p>The women in the control group received the usual care with pregnancy and neonatal health surveillance.</p>
Results					
<ul style="list-style-type: none"><li>- The children visited by nurses, used less tobacco, alcohol or drugs, or when they used it they did it in smaller quantity and in less days, reported fewer psychological/psychiatric disorders, had better results on reading and mathematics test on the age of 12 years old. There were no statistically significant effects of the program on children's ability to concentrate, behavioral problems and school achievement.</li><li>- Placement of the child in special education and school retention was less significant in the control group, but in the sample the mothers presented more economic and social resources than those in the intervention group.</li></ul>					

Table 2 – Methodological characteristics of the selected studies and main results.  
(HV performed by nurses according to the Nurse Family Partnership program).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Eckenrode J, Campa M, Luckey D, et al. Long-term Effects of Prenatal and Infancy Nurse Home Visitation on the Life Course of Youths. <sup>(E4)</sup> (2010)	USA	Three hundred and ten (78%) youngsters aged 19 out of the 400 families enrolled in the FNP program. The selected mothers were primiparous and young (19 years old), single or of low socioeconomic level.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Randomized trial controlled</li><li>- Follow-up</li><li>- Evaluation at the 19 years with interviews to the young people.</li></ul>	Examine the effect of VD prenatal nursing and child on the development of the course of life of 19 years adolescents.	Families of the control group received prenatal health care in consultation up to two years of life. The development was evaluated and referred for treatment when any change was detected. Families in the intervention group received the same services as the control group, but also received a nurse who visited them at home during pregnancy (9) and postpartum until the child's second
Results					
- Girls in the intervention group were less often jailed and sentenced and had fewer life sentences and convictions. Children born to single and low-income mothers had fewer children and used less Medicaid than their comparison group. For boys, the probability of a prison arrest increased substantially for intervention and control groups after 12 years old. Although the standard of outcomes is consistent with the effects of intervention in detentions and convictions found at age 15, no significant sex differences were found in these results. No effects were found on other young people, such as lifestyles and academic achievement.					

Table 2 – Methodological characteristics of the selected studies and main results.  
(HV performed by nurses according to the Nurse Family Partnership program).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Mejdoubi J, Heijkant S, Leerdam F, et al. The Effect of VoorZorg, the Dutch Nurse-Family Partnership, on Child Maltreatment and Development: A Randomized Controlled Trial. <sup>(E5)</sup> (2015)	Netherlands	223 women and children, underprivileged, primiparous and less than 26 years old as the control group and 237 as intervention group with the same characteristics.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Almost Experimental</li><li>- Randomized controlled trial</li><li>- Review at 18 and 24 months with inquiries of the cases records of ill-treatment, interviews to parents and application of evaluation scales.</li></ul>	Describe the efficiency of VoorZorg, that is the Dutch adaptation of NFP.	The women in the control group received the usual care, that is to say, paediatric child health surveillance and two HV by a nurse specialist in paediatrics, in the first and second week postpartum. Women in the intervention group received usual care and 10 HV during pregnancy, and 40 in the first and second year of the child's life by trained and experienced nurses.
Results	Three years after birth, 19% of children in the control group reported on a Child Abuse Care Center, 11% of the children in the intervention group were significantly smaller. From 6 to 18 months, total home environment assessment scores increased in both groups. At 24 months, the intervention group achieved significantly better results in assessing the home environment. At 24 months after birth, children in the intervention group had a significant improvement in psychiatric disorders, but no evidence of difference in the control group in aggressive behaviors.				

Table 2 – Methodological characteristics of the selected studies and main results.  
(HV performed by nurses according to the Nurse Family Partnership program).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Robling, M. Bekkers MJ, Bell K, et al. Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial. <sup>(E6)</sup> (2015)	United Kingdom	Nulliparous and children with age equal or lower than 19 years, 823 women were randomly designated to receive FNP and 822 to receive ordinary care.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Almost Experimental</li><li>- Randomized controlled trial</li><li>- Evaluation at 12, 18 and 24 months with consultation of maternal and child health records and interviews with mothers.</li></ul>	Establish the effectiveness of the FNP implemented and included in the national health care, funded by public funds.	The FNP involves up to 64 structured home visits by specially recruited family nurses from early pregnancy until the children are 2 years old. All participants (both groups) received usual health care. This included being offered universally, HV until the child's second birthday, delivered by family nurses (FNP group) or community health specialist nurses (usual care group) and maternal care clinical need.
Results	<p>- 304 (56%) of 547 women attributed to PNF and 306 (56%) of 545 assigned to usual care smoked late in pregnancy. The mean weight of 742 infants with mothers attributed to PNF was 3217 g, and of the 768 babies attributed to usual care was 3197 g. 587 (81%) of 725 children evaluated with mothers assigned to the PNF and 577 (77%) of 753 children evaluated assigned to usual care attended at an emergency service or were admitted to hospital at least once before the second birthday. 426 % of 643 women attributed to FNP and 427 (66%) 646 assigned to usual care had a second pregnancy in 2 years. At least one serious adverse event (mainly clinical events associated with pregnancy and infant period) was reported for 310 (38%) in the usual care group and 357 (44%) in the PNF group, none of which were related to intervention.</p>				

Table 3 – Characteristics of selected studies and main results.  
(HV carried out by Nurses).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Edraki M, Moravej H, Rambod, M. Effect of Home Visit Training Program on Growth and Development of Preterm Infants: A Double Blind Randomized Controlled Trial <sup>(E7)</sup> (2014)	Iran	Preterm newborns 30 intervention group and 30 control group.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Experimental</li><li>- Randomized controlled trial</li><li>- Six-month assessment with physical evaluations and application of development evaluation scale.</li></ul>	To investigate the effect of the HV program on the growth and development of preterm infants up to 6 months.	The HV intervention was provided by a specialist paediatric nurse. The first HV was performed the first day after discharge, the second session the day after the first session, and the third session was performed 1 week after the first visit. In addition, four visits were also provided in the first, second, third and sixth month after birth. In the control group, the information was provided, but no HV program was performed.
Results	<ul style="list-style-type: none"><li>- The children in the intervention group showed a greater weight gain at six months and in the development index. The results of the study showed a significant difference in the intervention group in relation to the development of behaviors, namely to follow objects in movement with the head, to keep the head steady by moving from sitting to sitting, producing sounds and picking up objects by hand.</li><li>- No significant difference was observed in relation to height and head, in both groups, in the several evaluations performed and in social laughter at six months.</li></ul>				

Table 3 – Characteristics of selected studies and main results.  
(HV carried out by Nurses).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Dodge K, Goodman B, Murphy R, et al. Implementation and Randomized Controlled Trial Evaluation of Universal Postnatal Nurse Home Visiting. <sup>(E8)</sup> (2014)	USA	2327 (intervention group), 2450 (control group). NB and families randomly distributed according to the date of birth. A random sub-sample of 549 families to assess the impact after birth.	- Quantitative Study- - Experimental - Randomized Controlled Trial - Evaluation at 6 months with consultation of hospital records, interviews with parents and application of evaluation scales and questionnaires.	Evaluating whether the universal postnatal nursing HV can be implemented with great adherence and fidelity, prevent recurrence of emergency services and promote positive parenting in infants up to 6 months of age.	Project "Durham Connects", structured with a procedure manual: 1 to 3 HV of nursing between 3 and 6 weeks of life of a baby and 1 to 2 nurse contacts with a community service provider. Concludes with a follow-up session one month later, by telephone or with HV.
Results Of all families, 80% started participating: accession was 84%. The program has a positive impact in reducing the use of emergency child health care. The impact begins immediately after the intervention and more than doubles in size up to the age of 6 months. The program was effective in improving family articulation with community resources. It also improved family well-being, specifically positive parenting behavior, quality of parent involvement, quality of out-of-home child care, family safety, and maternal mental health.					
Kemp L, Harris E, McMahon, C, et al. Child and family outcomes of a long-term nurse home visitation programme: a randomised controlled trial <sup>(E9)</sup> (2011)	Australia	208 (11 intervention, 97 control), mothers and newborns, with risk factors living in a underprivileged socioeconomic area.	- Quantitative study - Experimental - Randomized controlled trial - Evaluation at 18 and 24 months with interviews with parents and application of evaluation scales.	To investigate the long-term impact of a universal HV program by nurses on the health, development and well-being of the child, mother and family.	In the intervention group, several pre-natal and post-natal parental education nurses (paediatric specialist, 16 average) were carried out up to two years of age, structured and supported by a support program, incorporated into the universal child health system. In the control group, the usual universal care was available with a HV in the first 15 days of life.
Results - Mothers who received the intervention were more emotionally and verbally receptive during the first two years of their children's lives than the mothers of the comparison group. The duration of breastfeeding was higher for mothers in the intervention group. - There was no significant difference in the father-child interaction, in the mental, psychomotor or behavioral development of the infants, between the groups. - Mothers evaluated in prenatal care as having psychosocial changes and migrants benefited from the intervention were more likely to report a more positive experience of being a mother than the fewer subgroups of mothers in the comparison group.					

Table 3 – Characteristics of selected studies and main results.  
(HV carried out by Nurses).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Sadler L, Slade A, Close N, et al. Minding the Baby: Enhancing reflectiveness to improve early health and relationship outcomes in an interdisciplinary home visiting program <sup>(E10)</sup> (2013)	USA	60 families in the intervention group and 45 in the control group. They were between 14-25 years old; primiparous; no risk factor.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Almost Experimental</li><li>- Randomized controlled trial</li><li>- Evaluation at 12 and 24 months with interviews, application of assessment scale and consultation of maternal and child health records.</li></ul>	Evaluate the differences between families who received the Minding the Baby intensive home visits program and those who received usual care at a community health centre in the urban area.	<p>Families in the intervention group were visited weekly in the third trimester of pregnancy and during the child's first birthday and every two weeks until the child's second birthday and continued to receive prenatal care and usual primary and paediatric care. Visits are performed alternately by a paediatric nurse or social worker.</p> <p>In the control group the participants received routine prenatal health consultations and baby health surveillance consultations.</p>
Results	Intervention families had more up-to-date immunization programs at 12 months and had lower rates of subsequent births and were less likely to be referred to child protective services. Mother-infant interactions were less disrupted at 4 months, when mothers were adolescents. Children in the intervention group were more likely to bond securely and less likely to be disorganized in relation to the one-year bond. The mothers' ability to reflect on the experience of being a mother alone, as well as the reflexive functioning, improved during the intervention (24 months), only in mothers at greater risk.				

Table 3 – Characteristics of selected studies and main results.  
(HV carried out by Nurses).

Author/Year	Country	Sample	Study design	Purpose of the Study	Type of intervention
Ordway M, Sadler L, Dixon J, et al. Lasting effects of an interdisciplinary home visiting program on child behavior: Preliminary follow-up results of a randomized trial. <sup>(E11)</sup> (2014)	USA	50 dyads with children the ages of 3 an 5 who participated in the Minding the Baby program, selected from 132 primary study dyads.	<ul style="list-style-type: none"><li>- Quantitative study</li><li>- Follow-up</li><li>- Randomized controlled trial</li><li>- Evaluation at 3 and 5 years with interviews, application and evaluation scales to parents and teachers.</li></ul>	Evaluate the effects of Minding the Baby program on child behaviour and parental reflexive functioning (RF) 1 to 3 years after the intervention.	Intervention equal to the study of Sadler L, Slade A, Close N, et al. <sup>(E10)</sup> (2013)
Results	<ul style="list-style-type: none"><li>- The mean index of maternal depressive symptoms for both groups was below the threshold for clinically significant levels and did not differ statistically between the groups.</li><li>- The reflective functioning (Parenting) of the intervention group increased over time, while in the control group it decreased over time.</li><li>- Mothers in the control group reported higher levels of child behavior problems at all scales applied as well as on the child behavior scales filled by teachers, there was a trend indicating that they also rated the behavior of children in the control group as the most problematic.</li></ul>				



## DISCUSSION OF RESULTS

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With the analysis of the selected studies, it was noticed that there is a great investment in some countries, in the implementation of HV programs, carried out by nurses (USA, 7 studies). The methodology used in the studies, was controlled randomization, and the interviewers and technicians who performed the statistical analysis of the data were not aware of the intervention or control condition, of the sample they analysed, which reduces the possibility of systematic errors (bias). The data were collected in most of the studies, using interviews, questionnaires, validated scales for the population and by researching the child's health records and there was a study in which the data collection was performed only by self-report<sup>(19)</sup>, what can lead to bias.

The families that made up the samples from most studies are young, economically and socially underprivileged (E1) (E2) (E3) (E4) (E5) (E6) (E9). By focusing on the most threatened families, the HV programmes, seek to reduce health disparities and development outcomes. Studies indicate that high-risk groups are more likely to benefit from HV<sup>(16)</sup>.

One study evaluated the impact of the HV implementation, when performed universally, using only the date of birth for randomization (E8). However, there is controversy over the use of a universal approach, planned to work with all the families, in a given geographic area<sup>(2)</sup>. Two other studies have investigated young families without risk factor (E10) (E11). We have verified that there is evidence of the pertinence of the use of this sample, which tell us that there are factors that can make it difficult to have a home visit, such as, limited family resources, family mental illness, families not motivated to participate in programs and families that suffer from domestic violence. Risk factors that make children vulnerable interfere with the effectiveness of programs that are designed to help them<sup>(2)</sup>. Finally, we have a study in which the sample are preterm NB (E7). This sample is pertinent because there is evidence that low birth weight and prematurity has consequences on the child's health and development, both in the short and long term. Early interventions, particularly HV, appear to be an important strategy for improving outcomes in this population<sup>(17)</sup>.

The samples were mostly representative, except for the studies evaluating the impact of the HV at 6 months (E7) (E8), and in the two that use young families, but without risk factor (E10) (E11).

With the analysis of the selected studies we consider that the development of programs of home visits to the new-born/families performed by nurses have a positive impact on the health and well-being of both child and family. Current literature points favourably in this regard. The American Academy of Paediatrician recently supported the home visits program in the prenatal and postnatal periods and considered this program as a method for improving the health and the development of children and families<sup>(2)</sup> (E1).

In the USA, a pre-natal and post-natal (up to 2 years old) HV program was carried out by nurses, Nurse-Family Partnership (NFP), who intervene in young and underprivileged families, with the purpose of preventing the ill-treatment and child abuse and promote the healthy development of children. The nurse performs specific training to develop the program and follows a rigorous procedure manual, which specifies the specific aims of each HV. This program was applied in several communities and controlled randomized studies were developed with several follow up. The studies selected in this review, are follow up at 12 (E3) and at age 19 (E4), evaluate the impact on the health program and the living conditions of young people, comparing with the absence of HV. The difference found between the samples was the race, which in the study at 12 years were black race at 19, white race. The findings point to a better standard of living for young people in which the mothers were integrated into the NFP program, especially those with lower economic resources. At 12 years old they used less tobacco, alcohol or drugs, or when they used it they did it in less quantity and in less days, reported fewer psychological/psychiatric disorders, had better results from reading achievement tests and maths. The data collected in this study are in line with the randomization at 3<sup>(18)</sup> and 9<sup>(19)</sup> years. At age 19, the focus of the evaluation was on the involvement of the young people in crime. It was concluded that the young offspring of mothers who participated in the NFP program, especially girls, were less often arrested and sentenced and had fewer lifelong arrests. For boys, the likelihood of arrest increased substantially for intervention and control groups after 12 years of age. Although the pattern of results is consistent with the effects of intervention on detentions and convictions found at age 15<sup>(20)</sup>, no significant gender differences were found in these results. No further effects of the program were found on the remaining aspects of young people's life. The authors conclude that the impact on the health and well-being of children diminishes over time remaining solely in behaviour. These findings should be related to the limitations recognized by the authors namely, the data were collected based on the reports of young people, who may be subject to bias. Another limitation is the lack of racial diversity in the sample, which did not allow the examination of the racial and ethnic different in the treatment effects.

Another study analysed is the follow up at the 6 and 9 years of the FNP program, which evaluates the impact in child development, comparing the intervention when it is performed by nurses and by paraprofessionals (trained but unlicensed) (E4) and the absence of HV performance. The conclusions of this study emphasize the benefit of the intervention when performed by nurses. Although paraprofessionals performed the same training as nurses, the impact of the program on infant development, when performed by nurses, was higher. The conclusions of the study also compared the intervention performed by nurses with the other studies carried out previously and concluded that in this study there was no impact on children's intellectual functioning, academic functioning and aggressive behaviours, as observed in other studies<sup>(21,22)</sup>. The explanations found by the authors to justify the absence of effects of HV performed by nurses on these outcomes were: the program provided by the nurse loses its impact over time; the impact of the program is more noticeable for children born to low-income mothers and for families living in highly disadvantaged neighbourhoods (as in the case referred studies); the benefit of the program is greater where there is more room for improvement (the children in this group had lower average mental processing scores); the impact of the program for children born to low-resource mothers decreases, as children obtain therapeutic services that meet their needs of development. The sample from this study was statistically less significant than that of the other studies (E4). This result is not in agreement with the study analysed at the age of 12 (E3), which we verified to be the follow-up of those previously mentioned.

The NFP program has been implemented in other countries, following the same guidelines, but framed in the health services provided by each country. Two studies analyse the implementation of NFP in the Netherlands (E5) and the United Kingdom (E6). The results of the Netherlands study show that there was a favourable impact on the health and well-being of children and families, in the evaluation of the home environment and psychiatric disorders at 24 months. The intervention was compared to the usual care of the country, which include 2 home visits performed by a specialist paediatric nurse in the postpartum period. There were also fewer referrals of child abuse. There were no evidences of the program in the evaluation of aggressive behaviour. The researchers concluded that there are benefits when HV is carried out regularly, because it allows for more risky situations to be detected with referral.

Regarding the UK study (E6), the researchers concluded that there is no evidence of benefits of NFP implementation in the primary health outcomes of the mother and child evaluated mother and child. However, some benefit was observed for some secondary health and well-being outcomes mother-to-child development (intention to breastfeed,

child's cognitive development reported by the mother (only at 24 months), language development using a modified maternal-reported evaluation (at 12 and 18 months) and the use of a standardized assessment (the baseline initial language at 24 months), levels of social support, quality of the relation with the nurse and self-efficacy in general).

We observed that the control group received the usual health care of the country, which already includes HVs performed by community health specialist nurses, pre and postpartum up to two years of age. In our opinion, this is one of the reasons that justify the results. The authors note that, unlike woman in the US studies, young and underprivileged mothers in the UK can access many social and health services, including general practitioners, midwives and public health nurses. In addition, the previous studies carried out in the US involved a small number of nurses, 10, who performed the intervention. In contrast, the study in England was conducted by 131 family nurses, performing the intervention in 18 locations across England, and therefore represents a more pragmatic assessment of the NFP compared to previous trials. The researchers suggest long-term follow-up for this study, to ascertain evidence of benefit to child development outcomes that would occur after 2 years of age (E6).

The performance of HV by nurses (paediatric specialist) in the pre and postpartum up to 2 years in a structured program like the NFP, compared to the performance of a HV of nursing (specialist in paediatrics), during the first fifteen days of life, was studied in the Australia. The results of the study revealed that the impact of the intervention was more significant in the evaluation performed in the mothers (mainly migrant and psychosocially ill mothers), who were more prepared to exercise parenting and the duration of breastfeeding was greater. There was no significant impact on the mental, psychomotor or behavioural development of infants. These findings contradict the results of the study conducted in the Netherlands (E5), which has a similar design and demonstrated that there was a favourable impact on the health and well-being of children and families, when the HVs were performed according to NFP program. This may suggest that the program is more effective when mothers are younger (as is the case in the Netherlands study): the impact on children's health and well-being is more evident. Another study that evaluates the impact of the performance of HVs on the health of the child at 12 months, when performed by nurses, associating the intervention of community health workers (E1), demonstrates that there were no gains when adding the intervention of these technicians. It meets the results of Olds, et al., which affirm (E2) that the impact of the HV, on the child/family health, is more evident when it is performed by nurses.

Two of the studies reviewed evaluated the impact of post-partum HV on the health and well-being of the child and child/family at 6 months of age, when performed by nurses and universally, compared to the absence of HV. One of the studies carried out in Iran on a sample of preterm NB (E7), intervention was performed by a specialist paediatric nurse, and it was demonstrated that there was a positive impact. Preterm NB presented better development index and weight gain, as evidenced in the literature review by Mallik and Spiker<sup>(17)</sup>. The other study conducted in the USA, had as sample term newborns (E8) and intervention was performed by nurses, accompanied by community providers, who have the function of articulating health care with community services. The results show that families have joined the program and that it has positive impact in reducing the use of emergency child health care. The impact begins immediately after the intervention and more than doubles up to the age of 6 months. The program also improved the family's well-being and was effective in improving family articulation with community resources. We concluded that there is evidence of a positive impact of the HV performed by nurses on the health and well-being of the child/family in the short-term evaluation, but we emphasize the limitation of the results of the two studies, also reported by the authors, because the sample was limited to a specific community, which may affect the generalization of the results.

The impact of pre and postnatal HV (up to 2 years) by nurses (paediatric specialist) on the health and well-being of the child/family health was also assessed in a study conducted in the USA, including the participation of a social worker, in young families with no risk factor. The impact was evaluated at 12 months (E10) and when children were between 3 and 5 years old (E11). The results show a positive impact of intervention on the health and well-being of the child/family, both at 12 months, and at 3 to 5 years of the child's life. At 12 months the evaluation focused on the prevention of child abuse and maltreatment and on evaluation of bonding, parent/child interaction and parenting. The results showed fewer cases of children referred for child protection services of the HV target group, and were also found by the study by Mejdoubi, et al. (E5). It was also verified that in adolescent mothers, the intervention had even more impact. At 3 and 5 years of age, the evaluation focused on the maternal depressive symptoms, which did not show benefits in the parental reflexive functioning. This is positive parenting and it presented higher rates in the evaluation of the child's behaviour, which was considered by parents and teachers less problematic in the children who had belonged to the intervention group. We caution that this study had limitations, referred by the authors, which was the sample size and incomplete data on longitudinal measurements.

We verified that the intervention of the social worker focused on helping mothers in the negotiation of legal and judicial issues and that intervention of the nurse focused on strengthening parental care, health education, health support and child development and in the articulation of care with primary health care. Therefore we can not evaluate the results between the intervention of the two health technicians, but we conclude that interdisciplinary intervention has benefits in the promotion of the health and well-being of children/families, as evidenced by the American Academy of Paediatrics<sup>(8)</sup>.

## CONCLUSIONS

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This systematic review of literature allowed us to conclude that the approaches of the interventions used and the evaluated impact of the several studies are very varied which, in our opinion, difficult to systematize the results.

The results showed that the HV performed by nurses to the new-born/infant/family has a positive impact on the health and well-being of children and families. However, the specific results of the family have had less evidence, since most of the randomized controlled trials evaluated them separately. Taking into consideration the outcomes of impact on the child, these studies were not included in the review.

We can also conclude that the performance of the HV by nurses, to NB/infant/family, has a greater impact, if it is carried out in economically and socially underprivileged populations and in teenagers, and when performed with regularity, beginning during pregnancy and covering the first and second year of the child's life. The positive results were also verified in preterm NB and even when offered universally. In addition, the HV that are performed according to a well underlined and structured programme, such as NFP, also seem to have a greater impact on the health and child's well-being. The benefit of the same by other professionals was not evidenced.

We can conclude that the impact of the performance of HV by nurses, on the health and well-being of children is losing evidence over time, but in families it is maintained, especially in the most disadvantaged families. As less studies have been carried out, at more advanced ages, the pertinence of more studies is justified.

Another of the conclusions of this review is that Nursing HV to NB/infant/family was performed in most studies by Family Nurses, with specific training to perform HV and by Specialist Nurses in Child and Paediatric Health, but we could not conclude, however,

what is the difference between the two. Therefore, studies in this thematic would also be relevant. The results of this review confirm the results presented by other systematic reviews, which followed the same guideline, based on less recent literature.

One of the limitations of this review was the great heterogeneity of interventions and evaluated results, despite the fact that all studies demonstrated, in primary or secondary results, that a Nursing Home Visit has a positive impact on health outcomes of the child, including a decrease in the recurrence of emergency services, child behaviour and development, abuse prevention and child maltreatment, school achievement and the results in maternal health and parenting. The Nursing Home Visit to the NB/infant/family has evidence based on the practice of having a positive impact on the health and well-being of child and families and for that reason the dissemination of the programme in Portugal is, in our opinion, strongly recommended.

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