

Impact of educational strategies in low-risk prenatal care: systematic review of randomized clinical trials

Esther Pereira da Silva ¹
Roberto Teixeira de Lima ²
Mônica Maria Osório ¹

Abstract *This study aimed to analyze the impact of educational strategies developed in low-risk prenatal care on obstetric outcomes from a systematic literature review. This review consulted databases PubMed, Medline, SciELO and Lilacs, analyzing randomized clinical trials with the following birth outcomes: birth weight, prematurity and breastfeeding, using the following combination of keywords: pre-natal, antenatal visits, education, health education, pregnancy outcomes, birth weight, prematurity, breastfeeding and randomized clinical trial. Nine studies were included following quality evaluation. Actions prove to be more effective when extended to the postpartum period. Most of them occurred during home visits and had a positive impact on breastfeeding and birth weight. The establishment of groups of pregnant women contributed to lower prevalence of prematurity. Breastfeeding was found to be the outcome most sensitive to educational strategies. Educational practices during the prenatal period contributed to favorable obstetric outcomes as they minimized pregnant women concerns and anxiety during the pregnancy process, preparing them for childbirth and postpartum, and should be incorporated into health services' work process.*

Key words *Prenatal, Randomized controlled trial, Health education*

¹ Programa de Pós-Graduação em Nutrição, Universidade Federal de Pernambuco. Av. Professor Moraes Rego 1235, Cidade Universitária. 50670-901 Recife PE Brasil.
estherp.silva@yahoo.com.br

² Departamento de Nutrição, Universidade Federal da Paraíba. João Pessoa PB Brasil.

Introduction

Prenatal care is a set of clinical and educational procedures that aim to monitor the development of pregnancy and promote mother and child health. It includes the reception of women from the onset of their pregnancy to postpartum. This is a period characterized by physical and emotional change that each woman experiences differently, so she must receive comprehensive care from health teams¹.

Adequate monitoring of pregnant women is related to benefits for both the mother and the fetus and future baby, enabling the detection and timely treatment of morbidities, reducing the incidence of low birth weight and prematurity and promoting breastfeeding².

Prenatal care quality should not only focus its quantitative aspects, such as the number of consultations or prenatal care onset gestational age, since it prevents the visualization of the material impact on its content. Therefore, the incorporation of strategies aimed at ensuring prenatal care with a comprehensive and problem-solving approach is required^{2,3}. Among these, we wish to highlight educational strategies. However, regarding this subject, researchers have observed gaps in educational activities during prenatal care, since low-risk pregnant women receiving prenatal care regularly show a lack of knowledge about pregnancy-derived changes and lack of preparation for childbirth as they come into the final month of their pregnancy⁴⁻⁶.

Women should be well instructed during prenatal care so that they may experience positively childbirth, suffer lower complications risks in the postpartum period and be more successful in breastfeeding⁴. Information on the various experiences should be shared between women and health professionals. Support groups strategies and training visits to women households by experts have been successfully implemented in prenatal health care models^{1,4}. Experience and knowledge exchange is the best way to understand the pregnancy process, it adds an educational component to care and provides greater support to pregnant women during the prenatal period, thus contributing to better obstetrical outcomes⁷. Therefore, in this context, health professionals should be qualified for educational work, trained to understand changes experienced during pregnancy and exercise the role of educators and health promoters¹. Before the importance of educational strategies in prenatal care and their possible relationship with favorable

birth outcomes, this study aims to present a systematic review of the impact of educational strategies used in prenatal low-risk pregnant women, in the following obstetric outcomes: birth weight, prematurity and breastfeeding practice, from randomized clinical trials.

Methods

Protocol, research strategy and selection criteria were in accordance with the guidelines of Cochrane Handbook for Reviewers, Federal University of São Paulo⁸ and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)⁹.

Search strategies

The systematic search for studies was conducted in four electronic databases (Pubmed, Medline, SciELO and LILACS), using the following Health Science Descriptors/*Medical Subject Headings* (DeCS/MeSH): “pre-natal” AND “antenatal visits” AND “education” OR “health education” AND “pregnancy outcomes” AND “birth weight” OR “prematurity” OR “breastfeeding” AND “randomized clinical”. Bibliographic search was carried out in the period April-September 2014.

Only study type and obstetric outcome filters were used, as per selection criteria described below. In addition, systematic reviews' references on the subject were analyzed in order to find papers that had not been detected in databases' search.

Study selection criteria

Study selection was independently conducted by two reviewers, and a third experienced researcher was consulted when in doubt. Research was performed in two stages: evaluation of titles and abstracts of all identified studies and full text assessment.

Inclusion criteria for the study were: 1) Randomized clinical trial; 2) Study with at least one of the selected obstetric outcomes (birth weight and / or prematurity and / or breastfeeding); 3) Educational intervention occurred during prenatal care; 4) Contemporary intervention and control groups that received the same cumulative duration of treatment or no treatment.

Repeated publications of the same study in different databases were computed in only one of

the following databases, considering the following order of priority: Pubmed, Medline, SciELO and Lilacs.

Study quality evaluation

Standards of the Cochrane Handbook for Reviewers, Federal University of São Paulo⁸ for randomized controlled trials which classify studies in four categories were followed to evaluate the quality of papers, namely:

- *Category "A"*: Means that the random allocation process has been properly reported by: centralized randomization by headquarters; sequential administration of pre-coded or numbered packages to participating subjects selected for the study; distance computerized system available full-time; computer generated-data containing coded program distribution; opaque and numbered serial envelopes and other means that apparently offer adequate allocation, combined with the fact that the person who made the allocation concealment is not involved in their use;

- *Category "B"*: Means that the allocation concealment was not described, but the text mentions that the study is randomized, indicating that the allocation seems to be appropriate although there is no other available information;

- *Category "C"*: Means that the allocation concealment was inadequate, in which there are, for example, interleaving data, medical records numbers, birth dates, week days, etc.; and

- *Category "D"*: Means that the study was not randomized.

Also, according this handbook's guidelines, A- or B-classified items were included in the systematic review, whereas. C- or D-classified were excluded since they were not considered as randomized clinical trials.

Outcomes

Of the surveyed studies, 235 original studies and 3 systematic reviews were found. Ninety-two references were left after verification of duplicate references. Of these, 20 abstracts met the selection criteria and were submitted to full text review. Text reading and quality evaluation excluded 11 articles, leaving 9 studies which were included in this systematic review (Figure 1).

Table 1 describes the general characteristics of studies. Although language and period filters have not been used, studies were published in English from 1995 to 2013.

Seven studies were classified as quality-A^{10-13,15-17}. Of the two classified as quality-B^{14,18}, one was held in a developing country¹⁸.

Brent et al.¹⁰, in New York, United States, worked with 108 low-income pregnant women receiving care at an outpatient prenatal care center, in order to evaluate the effectiveness of an intervention program to increase breastfeeding, randomized study population into two groups, namely, control and intervention. In the control group, prenatal care was provided at the institution through traditional clinical consultations (patient-doctor); in the intervention group, women received monthly throughout the pregnancy period up to the first year postpartum home visits by health professionals trained in the subject of breastfeeding, called "lactation consultants". During these visits, professionals discussed in participatory fashion about the importance of breast milk, physiology of the breast and breastfeeding management issues, using teaching and illustrative materials on the topic, preparing

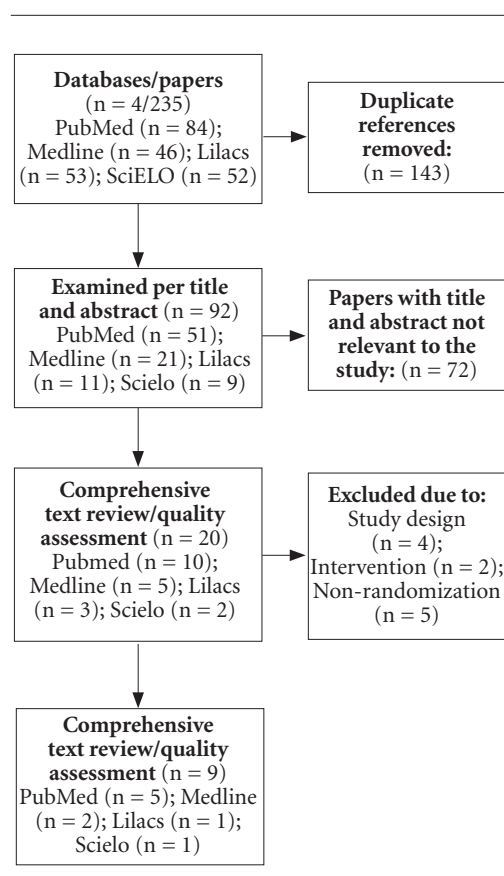


Figure 1. Flowchart of qualifications according to PRISMA guidelines.

Table 1. Randomized clinical trials included in the review. Recife/PE, 2014.

Author, year, location	Quality Level	Sample	Reviewed outcomes of interest to the study	Inclusion criteria	Intervention Strategy	Intervention Duration	Review outcomes
Brent N et al. (1995), EUA	A	- 108 pregnant women (I = 51; C = 58)	- Breastfeeding	- Low income pregnant women; - Reside near study location; - Low-risk pregnant women	- Strategic home visits by health professionals trained in lactation; - Discussion on the importance of breastfeeding, questions, breast physiology.	Monthly during prenatal care up to 1st year postpartum	Prevalence of early exclusive breastfeeding initiation: I = 61% C = 32% p = 0,02*
Chapman D et al. (2004), EUA	A	- 165 pregnant women (I = 90; C = 75)	- Breastfeeding	- Pregnancy < 26 weeks; - >18 years of age; - Study location dwellers; - Low income; - Low-risk pregnant women	- Strategic home visits of community women trained in breastfeeding; - Topics covered include anatomy and physiology of the breast, breastfeeding management, counseling techniques and related social and cultural factors; - Educational materials	Monthly in prenatal up to the 6th month postpartum	Prevalence of no early exclusive breastfeeding initiation: I = 8,9 % C = 22,7% OR = 0,39 (CI 95% 0,18-0,36)*

it continues

pregnant women to perform this practice properly. This strategy resulted in a higher prevalence of early initiation of exclusive breastfeeding, considering the first 48 hours after delivery in the intervention group (61%) compared to the control group (32%), with significant statistical results.

In their study, Chapman et al.¹¹ randomized 165 low-risk and low-income pregnant women, over eighteen years of age and under 26 gestational weeks in the city of Connecticut, United States in order to assess the effectiveness of a breastfeeding practice counseling program. Intervention strategies were developed from monthly home visits by women living in pregnant women's dwelling areas during prenatal care until the

sixth month postpartum. Women who made home visits had completed high school, breastfed a child for a period of at least six months and underwent training by health professionals from local services to work with the breastfeeding issue. During the visits to the intervention group, topics included: anatomy and physiology of the breast, breastfeeding management, counseling techniques, cultural and social factors related to this practice; making use of teaching resources such as illustrative materials, videos and explanatory brochures on the subject. It was observed that, in the control group, in which prenatal care was developed only for clinical consultations, the prevalence of mothers who did not undergo ear-

Chart 1. continuation

Author, year, location	Quality Level	Sample	Reviewed outcomes of interest to the study	Inclusion criteria	Intervention Strategy	Intervention Duration	Review outcomes
Olds D et al. (2004), EUA	A	1.178 pregnant women (I = 735; C = 443)	- Birth weight	- Pregnant women residing at the study location with no prior childbirth - Pregnant women without health plans - Low-risk pregnant women	- Strategic home visits by health professionals; - Discussing issues on maternal and fetal health, encouraging self-care and family planning with the use of illustrative materials and teaching	Monthly during prenatal care	Prevalence of low birth weight: I = 2,8% C = 7,7% p = 0,03*
Bonuck K et al (2005), EUA	A	304 pregnant women (I = 145; C = 159)	- Breastfeeding	< 24 weeks pregnancy Contact with mother and child available up to 12 months postpartum - pregnant women/ mothers not taking medicines incompatible with breastfeeding - Low-risk pregnant women	- Strategic home visits by local workers trained in breastfeeding; - Workers discussed the physiological characteristics and benefits of breastfeeding using illustrative materials, dolls and artificial nipples and also preparation for childbirth and early initiation of breastfeeding	Monthly during prenatal care up to 12 months postpartum	Prevalence of exclusive breastfeeding in 6 months postpartum: I = 53% C = 39,3% p<0,028*

it continues

ly breastfeeding was higher (22.7%) compared to the intervention group (8.9%), with statistical significance.

In the study by Olds et al.¹², which aimed to examine the impact of educational strategies during home visits in obstetric outcomes and childhood, birth weight was the analysis variable studied by these authors. In this study, 1,178 pregnant women from 21 public prenatal care clinics in the city of Denver, United States were randomized. The interventional component resulted from home visits during prenatal

care by health professionals. Subjects such as the importance of prenatal care, food intake during pregnancy, pregnancy clinical complications and family planning were addressed during visits, using teaching and illustrative materials. A significantly lower prevalence of low birth weight (2.8%) was noted in the intervention group compared to the control group (7.7%).

In a study developed with 304 pregnant women receiving care at two public health centers in New York, United States, Bonuck et al.¹³ used educational strategies from home visits made by

Chart 1. continuation

Author, year, location	Quality Level	Sample	Reviewed outcomes of interest to the study	Inclusion criteria	Intervention Strategy	Intervention Duration	Review outcomes
Aidam B <i>et al.</i> (2005), Gana	B	231 pregnant women (I = 136; C = 95)	- Breastfeeding	-Pregnant women in the last quarter; - Gave birth to term babies with adequate birth weight in the selected hospitals of the study; -Residing in the community for at least 06 months postpartum - Low-risk pregnant women	- Strategic and participatory home visits by breastfeeding-trained counsellors (nurses and nutritionists); - Issues discussed during visits: Mother and child breastfeeding benefits, early initiation of this practice, the importance of colostrum, breastfeeding techniques, artificial milks risks and prevention and treatment of lactation issues.	Monthly during prenatal care up to 1st year postpartum	Prevalence of exclusive breastfeeding initiation in the first three months postpartum: I = 92,1% C = 65,9% p = 0,04* Prevalence of exclusive breastfeeding in the first six months postpartum: I = 39,5% C = 19,6% p = 0,02*
Ickovics J <i>et al.</i> (2007), EUA	A	993 pregnant women (I = 623; C = 370)	- Prematurity - Birth weight - Breastfeeding	- < 24 weeks pregnancy - < 25 years of age - Non high-risk pregnant women - Speaking English or Spanish	- Prenatal care was performed in groups (maxim 8 pregnant women) with professionals discussing issues raised by the very pregnant women regarding concerns related to pregnancy, childbirth, breastfeeding, newborns care; pregnant women were handed copies of their tests and weight records (self-care incentive).	Monthly during prenatal care	Prevalence of prematurity: I = 9,8% C = 13,8% OR = 0,67 (CI 95% 0,44-0,99) p = 0,045* Prevalence of low birth weight: I = 10,7% C = 11,3% OR = 0,98 (CI 95% 0,64- 1,50) p = 0,90 Early initiation of exclusive breastfeeding I = 66,5% C = 54,6% OR = 1,73 (CI 95% 1,28- 2,35) p = 0,01*

it continues

Chart 1. continuation

Author, year, location	Quality Level	Sample	Reviewed outcomes of interest to the study	Inclusion criteria	Intervention Strategy	Intervention Duration	Review outcomes
Edwards R et al. (2013), EUA	A	248 pregnant women (I = 124; C = 124)	- Breastfeeding	- < 34 weeks pregnancy - < 21 years of age - Non high-risk pregnant women	- Strategic home visits by "doulas"; - Visits topics: breastfeeding benefits, using illustrative materials and videos; personal breastfeeding experiences were shared, addressing child nutrition and dispelling breastfeeding myths.	Monthly during prenatal care up to 12 months postpartum	Early initiation of exclusive breastfeeding : I = 63,9% C = 49,6% p = 0,02* Duration of exclusive breastfeeding > 4 months: I = 8,3% C = 4,4% p = 0,10
Karp S et al. (2013), EUA	A	-130 pregnant women (I = 73; C = 57)	- Breastfeeding	- < 24 weeks pregnancy; - Speaking and reading English; - Living close to study location - Low income; - Low-risk pregnant women	- Strategic home visits by health professionals; - Visits topics: breastfeeding benefits, breastfeeding avoidance risks and discussing prior breastfeeding difficulties; - Educational resources, teaching materials	Monthly during prenatal care and 01 visit postpartum	Prevalence of exclusive breastfeeding early initiation I = 68,5% C = 59,6% p = 0,295
Lutenbacher M et al. (2013), EUA	B	211 pregnant women (I = 109; C = 102)	- Prematurity	- < 24 weeks pregnancy - 1 prior preterm childbirth - Speaking English - Living close to study location - Low-risk pregnant women	- Strategic home visits by health professionals according to specific protocols addressed: - Guidance to pregnant women regarding childbirth, breastfeeding, pregnancy concerns, using teaching materials and ensuring access to psychiatric and social services, when necessary.	Monthly during prenatal care and 01 immediate visit postpartum	Prevalence of prematurity: I = 8% C = 13% p = 0,361

I = Intervention Group; C = Control Group; * Significant outcomes.

workers residing in women's dwelling areas in order to determine whether these measures would impact on the duration of breastfeeding. These workers were trained by health professionals services studied in relation to lactation. Issues related to mothers' breastfeeding intentions, breastfeeding benefits, physiological characteristics of the breast, preparation for childbirth and early initiation of breastfeeding were discussed in the visits with the help of educational brochures, dolls and artificial breasts. A statistically significant higher prevalence of exclusive breastfeeding during the six-month postpartum period (53%) was reported for pregnant women of the group with these actions compared to the group that received only traditional clinical consultations (39.3%) .

In a study conducted in Ghana with 231 pregnant women receiving care at antenatal care clinics of two local hospitals, Aidam *et al.*¹⁴ developed educational strategies during home visits during prenatal care up to the first postpartum year, in order to determine whether these interventions contribute to the proper practice of breastfeeding. These meetings were conducted by two local nurses and a nutritionist. These health professionals should have breastfed a child for at least six months and be recognized in the community as a credible source of health information to be included in the study. In these visits, women in the intervention group received information on the following topics: definition of breastfeeding, incentives to early initiation, importance of colostrum, benefits of breastfeeding for mother and baby, breastfeeding techniques and treatment of lactation problems (engorgement, sore nipples). Women were encouraged to ask questions during the educational sessions. The questions raised by pregnant women were discussed and added as additional topics for future visits. A higher prevalence of exclusive breastfeeding was observed in the three and six months postpartum periods (92.1% and 39.5%) in the intervention group than in the control group (65.9% and 19.6%), with significant statistical results.

Working with 993 pregnant women from two university hospitals of reference in obstetrics in Atlanta and New Raven, United States, Ickovics *et al.*¹⁵ proposed an educational strategy of two-hour prenatal care provided in groups of a maximum of eight pregnant women in order to verify the impact of this intervention on birth weight, prematurity and breastfeeding, as well as psychosocial function and user satisfaction. Initially, patients were individually evaluated for weight, blood pressure and uterine height record and

then women in the intervention group were referred to groups mediated by health professionals of analyzed services. Knowledge and concerns among pregnant women were shared in these environments and the topics discussed were worked around prenatal care goals, namely, breastfeeding, preparation for childbirth and postpartum period, and women were encouraged to self-care (with return of laboratory tests for monitoring purposes). Educational materials were distributed and, at the end of each session, pregnant women evaluated activities. Authors observed a lower prevalence of prematurity (9.8%) and higher prevalence of early initiation of breastfeeding (66.5%) in the intervention group compared to the control group (13.8% and 54.6%, respectively). However, it was observed that the educational strategy was not effective regarding low birth weight outcome.

A study developed by Edwards *et al.*¹⁶ included 248 pregnant women receiving care at a prenatal clinic of the University Hospital, University of Missouri, United States. Women were randomized from a statistical program, with no significant differences with regard to socio-economic and demographic characteristics of the control and intervention groups. In the control group, pregnant women received prenatal care clinical consultations (patient-expert).

The educational strategy used in the intervention group was home visits during prenatal care by local workers called "doulas" (African American women of communities under study). These women received training on breastfeeding with qualified health professionals. Visits were based on the construction of a bond with pregnant women, discussing health during pregnancy, preparing for childbirth, child nutrition and listening to the ideas and concerns of women regarding breastfeeding and working with pregnant women's breastfeeding myths and taboos. Doula reported their personal experiences about breastfeeding or the experiences of other women in the community in order to streamline the concept of breastfeeding with examples of mothers with similar cultural and community backgrounds. Printed educational materials, videos and illustrative brochures were used in this case. A higher prevalence of early initiation of exclusive breastfeeding in women who participated in this intervention (63.9%) was noted compared to women in the control group (49.6%), with statistical significance. Exclusive breastfeeding greater than four months showed no statistical difference between the two groups.

Karp et al.¹⁷ studied the prevalence of breast-feeding initiation in women receiving care at a university center in Southeastern United States and developed a prospective study in which they randomized 130 pregnant women into two groups: the control group (n = 57) and the intervention group (n = 73). Women in the control group received traditional clinical prenatal care consultation at the health service facility and the intervention group received monthly home visits during prenatal care and postpartum by health professionals specialists in obstetrics in addition to consultations.

Visits included health education actions based on standardized research protocols that used teaching resources such as illustrative brochures and videos. The following issues were discussed with pregnant women: maternal clinical complications, oral health, stress, use of medication during pregnancy, nutritional guidelines and physical activity, reproductive life planning and breastfeeding. Regarding breastfeeding, professionals addressed benefits and risks of abstaining from of this practice and discussed previous breastfeeding experience of pregnant women. No difference was noted between the groups following control of variables related to race, income, marital status, tobacco use and age, although women in the intervention group had a higher prevalence of early breastfeeding (Intervention = 68.5%; Control = 59.6%).

By analyzing prematurity as an outcome, Lutenbacher et al.¹⁸, at Vanderbilt University Medical Center, USA, randomized 211 pregnant women into two groups: the control group (n = 102), in which women performed the traditional clinical prenatal care consultation (doctor-patient); and the intervention group (n = 109), which also included home visits by health professionals making use of teaching materials that addressed the following topics suggested by pregnant women: Guidelines regarding clinical complications, maternal and perinatal health care, childbirth and breastfeeding, as well as ensuring referral to psychiatric and social service, when needed. There was no significant difference between the groups, however, a higher prevalence of preterm births was observed in the control group (13%) compared to the intervention group (8%).

Discussion

This systematic review revealed a shortage of studies using educational strategies in randomized clinical trials during the prenatal period. Most studies have shown that the development of educational strategies during prenatal care has a positive impact by providing better obstetric outcomes, where pregnant women who participated in educational activities showed lower prevalence of low birth weight¹² and prematurity¹⁵, as well as earlier and lengthier practice of exclusive breastfeeding^{10,11,13,14,16}.

Despite two studies^{16,18} in which educational interventions did not show statistically significant results, it should be noted that a higher prevalence of favorable birth outcomes was observed in the intervention groups.

Health education as a pedagogical process requires the development of critical and reflective thinking; it unravels the reality and proposes transformative actions that lead individuals to their emancipation as historical and social subjects capable of proposing and commenting health decisions to take care of themselves, their family and their community¹⁹.

Health education practices should involve three segments of primary stakeholders: health professionals who value prevention and health promotion as well as healing practices; managers to support these professionals; and people who need to build their knowledge and ensure autonomy in their health care, both individually and collectively. They should be inherent to health care services' work process. However, many times, they are placed in the background in the planning and organization of services, implementation of care actions and management itself²⁰.

The main educational activities observed in the studies took place during home visits by professionals or trained local workers, with the use of educational resources such as videos, illustrative materials, explanatory brochures, dolls and artificial nipples^{10-14,16-18}. Of the eight studies that worked with this initiative^{10-14,16-18}, six showed favorable births outcomes in women who participated in the intervention group, with statistical significance^{10-14,16}.

In this context, home visits to pregnant women must also be understood as an intervention tool to be used by health teams' members to understand the life and health conditions of pregnant women, their partners and family members and to identify the social and epidemiological

features and household's available resources. This information is important for planning the educational activities of health professionals, aiming at stimulating and enhancing users' empowerment and self-care²¹. Working with the whole family is crucial in the learning process during pregnancy^{1,2,21}.

As for the intervention duration, the most effective strategies stretched from prenatal care to postpartum^{1,2,4,5,7}, reaffirming the importance of continued care by health teams. Regarding this topic, benefits identified as being related to continued care are: greater possibility of integrating physical, psychological, social and economic realms; improved user-service provider relationship; promoting a more effective role in health maintenance by users and likely reduced care costs by preventing unnecessary duplication of services and treatments²².

With regard to prematurity, of the two studies^{15,18} evaluating this variable as review outcome, one of them had been successful when using the establishment of groups during prenatal care as an educational strategy¹⁵. However, Lutembacher *et al.*¹⁸ found no significant outcomes when making home visits by health professionals, probably due to the fact that, although they were low-risk pregnant women, these women under study previously had premature birth and home visits could not verify this clinical risk in the current pregnancy. Researchers^{15,18} point out that, in the case of women at risk, in addition to educational strategies, referral to high complexity services must be ensured to pregnant women.

Establishing groups during prenatal care as educational activity is an opportunity to create a dialogue channel between professionals and pregnant women, a space for the exchange of experiences among women that contributes to their empowerment and to prepare pregnant woman to address the physical and emotional changes that are part of the pregnancy process^{1,6}. In addition, groups encourage the participation of pregnant women as active subjects in prenatal care, valuing their concerns, since, while elementary to listeners, can pose a serious problem for those who experience them. In this context, these groups can be considered as therapeutic groups in which direct and safe answers are significant to the well-being of women and their families^{1,6,21}.

With regard to birth weight, the two studies that addressed this variable^{12,15} showed that educational strategies during home visits and the establishment of pregnant women groups during prenatal care were effective in reducing its prev-

alence. Birth weight is an important population health indicator, it reflects women's social, economic and environmental conditions during pregnancy. It is a women reproductive health care quality indicator, since the low quality of prenatal care is directly associated with the birth of low birth weight children²³.

Breastfeeding practice was the birth variable most used by authors to highlight the impact of educational strategies during the prenatal period. Of the nine studies included in the review¹⁰⁻¹⁸, seven^{10,11,13-17} worked with the breastfeeding outcome. It is worth noting that, of these studies, six^{10,11,13-16} showed a higher prevalence of this practice in the intervention group, with significant results, strengthening the importance of educational activities during prenatal care while preparing women for breastfeeding.

Considering the protective role of breastfeeding on infant morbidity and mortality, initiatives to promote such practice should be a priority in health services. Health teams should be trained in breastfeeding clinical management and counseling. Professional training is essential to the success of breastfeeding promotion, protection and support, giving jurisdiction to health teams and facilitating engagement with services' users²⁴.

Again on breastfeeding, intervention strategies most used by authors with a positive impact were: group-based prenatal care¹⁵, home visits by professionals¹⁰, participation of women from the community^{11,14,16} and lactation-trained investigative workers from the location of residence of pregnant women¹³.

Although this review has only assessed the intervention of educational strategies performed during prenatal care, it is important to point out that the analyzed birth outcomes bear multiple determinants of risk. Birth weight and prematurity are the major risk factors to little or advanced maternal age, inadequate lifestyle habits such as tobacco use and clinical complications such as anemia, urinary tract infection and gestational weight gain deficit^{25,26}. These variables are more difficult to modify. Breastfeeding, in turn, has a cultural component, including family influence as a strongly related determinant, and seems to be more sensitive to educational strategies^{27,28}, with the greatest prevalence differences between intervention and control groups compared to birth weight and prematurity of the studies included in the review.

But when it comes to quality of life indicators, even a small reduction observed for low birth weight and prematurity outcomes should

be taken into account as it can have a high impact on the health of the population studied.

It is noteworthy that prenatal care should not be restricted to the clinical-traditional model (patient-expert) in a practice room, but comprehensively include health education actions in the routine of care, including anthropological, social, economic and cultural aspects, which should be known by professionals providing care to pregnant women, seeking to understand them in the context in which they live, act and react^{1,6,29,30}.

Health professionals must be qualified to guide pregnant women in relation to these issues and should extrapolate the traditional clinical interventions and create intense learning moments and opportunities to develop health education as a realm of the care process²⁰. In this regard, health professionals should assume their educating role and share knowledge, giving back to women their confidence to live their pregnancy, childbirth and postpartum^{22,31}.

Conclusion

From these results, it was observed that intervention strategies developed during prenatal care with groups of pregnant women other than those carried out during home visits by professionals and dwellers living in the place of residence of these women and which are built and developed in pedagogical and participatory fashion contributed significantly to the reduction of prematurity and low birth weight, as well as provided higher prevalence of exclusive breastfeeding. Therefore, prenatal health care teams must be able to perform, incorporate and operate in routine care of specialized services educational strategies to guide women as to pregnancy-related clinical and psychological issues, preparing them for childbirth, postpartum and contributing to favorable obstetric outcomes.

Collaborations

EP Silva contributed to the concept of the study, design, review, data interpretation and drafting of the study. RT Lima worked on data review and interpretation and critical review of the study. MM Osório contributed to the concept and design of the study, data review and interpretation, drafting of the study and critical review and approval of the version to be published.

References

1. Brasil. Ministério da Saúde (MS). Secretaria de atenção à saúde. *Atenção ao pré-natal de baixo risco*. Brasília: MS; 2012.
2. Silva EP, Teixeira-Lima R, Costa MJC, Filho MB. Desenvolvimento e aplicação de um novo índice para avaliação do pré-natal. *Rev. Panam. Salud Públ.* 2013; 33(5):356-362.
3. Gomes RMT, Cesar JA. Perfil epidemiológico de gestantes e qualidade do pré-natal em unidade básica de saúde em Porto Alegre, Rio Grande do Sul, Brasil. *Rev. Bras. Med. Fam. Comunidade* 2013; 27(8):80-89.
4. Rios CTF, Vieira NFC. Ações educativas no pré-natal: reflexão sobre a consulta de enfermagem como um espaço para educação em saúde. *Cien Saude Colet* 2007; 12(2):477-486.
5. Trevisan MR, De Lorenzi DRS, Araújo NM, Ésber K. Perfil da Assistência pré-natal entre usuárias do Sistema Único de Saúde em Caxias do Sul. *Rev Bras Ginecol Obstet* 2002; 24(5):293-299.
6. Viellas EF, Domingues RMSM, Dias MAB, Gama SGN, Theme Filha MM, Costa JV, Bastos MH, Leal MC. Assistência pré-natal no Brasil. *Cad Saude Publica* 2014; 30(1):S85-S100.
7. Trudnak TE, Arboleda E, Kirby RS, Perrin K. Outcomes of Latina Women in Centering Pregnancy Group Prenatal Care Compared With Individual Prenatal Care. *J Midwifery Womens Health* 2013; 58(4):396-403.
8. Higgins JPT, Green S, editors. *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [cited 2011 Mar 2]. The Cochrane Collaboration, 2011. Available from: www.cochrane-handbook.org
9. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JPA, Clarke M, Devereaux PJ, Kleijnen J, Moher D. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Ann Intern Med* 2009; 151(4):65-93.
10. Brent NB, Redd B, Dworetz A, D'Amico F, Greenberg J. Breast-feeding in a Low-Income Population Program to Increase Incidence and Duration. *Arch Pediatr Adolesc Med* 1995; 149(7):798-803.
11. Chapman DJ, Damio G, Young S, Pérez-Escamilla R. Effectiveness of breastfeeding peer counseling in a low-income, predominantly Latina population: a randomized controlled trial. *Arch Pediatr Adolesc Med* 2004; 158(9):897-902.
12. Olds DL, Robinson J, O'Brien R, Luckey DW, Pettitt LM, Henderson CR Jr, Ng RK, Sheff KL, Korfmacher J, Hiatt S, Talmi A. Home Visiting by Paraprofessionals and by Nurses: A Randomized, Controlled Trial. *Pediatrics* 2004; 110(3):486-496.
13. Bonuck KA, Trombley M, Freeman K, McKee D. Intervention on Duration and Intensity of Breastfeeding up to 12 Months Randomized, Controlled Trial of a Prenatal and Postnatal Lactation Consultant. *Pediatrics* 2005; 116(6):1413-1426.
14. Ickovics JR, Kershaw TS, Westdahl C, Magriples U, Massey Z, Reynolds H, Rising SS. Group Prenatal Care and Perinatal Outcomes A Randomized Controlled Trial. *Obstet Gynecol* 2007; 110(2):330-339.
15. Edwards RC, Thullen MJ, Korfmacher J, Lantos JD, Henson LG, Hans SL. Doula Home Visiting Breastfeeding and Complementary Food: Randomized Trial of Community. *Pediatrics* 2013; 132(2):S160-S166.
16. Karp SM, Howe-Heyman A, Dietrich MS, Lutenbacher M. Breastfeeding Initiation in the Context of a Home Intervention to Promote Better Birth Outcomes. *Breastfeed Med.* 2013; 8(4):381-387.
17. Aidam BA, Pérez-Escamilla R, Lartey A. Lactation Counseling Increases Exclusive Breast-Feeding Rates in Ghana. *J Nutr* 2005; 135(7):1691-1695.
18. Lutenbacher M, Gabbe PT, Karp SM, Dietrich MS, Narrigan D, Carpenter L, Walsh W. Does Additional Prenatal Care in the Home Improve Birth Outcomes for Women with a Prior Preterm Delivery? A Randomized Clinical Trial. *Matern Child Health J* 2014; 18(5):1142-1154.
19. Machado MFAS, Monteiro EMLM, Queiroz DT, Vieira NFC, Barroso MGT. Integralidade, formação de saúde, educação em saúde e as propostas do SUS - uma revisão conceitual. *Cien Saude Colet* 2007; 12(2):335-342.
20. Falkenberg MB, Mendes TPL, Moraes EP, Sousa EM. Educação em saúde e educação na saúde: conceitos e implicações para a saúde coletiva. *Cien Saude Colet* 2014; 19(3):847-852.
21. Lima SS. Enfermagem no pré-natal de baixo risco na estratégia Saúde da Família. *Aquichan* 2013; 13(2):261-269.
22. Cunha EM, Giovanella L. Longitudinalidade/continuidade do cuidado: identificando dimensões e variáveis para a avaliação da Atenção Primária no contexto do sistema público de saúde brasileiro. *Cien Saude Colet* 2011; 16(1):1029-1042.
23. Capelli JCS, Pontes JS, Pereira SEA, Silva AAM, Carmo CN, Boccolini CS, Almeida MFL. Peso ao nascer e fatores associados ao período pré-natal: um estudo transversal em hospital maternidade de referência. *Cien Saude Colet* 2014; 19(7):2063-2072.
24. Fonseca-Machado MO, Haas VJ, Monteiro JCS, Gomes -Sponholz F. Formação continuada na enfermagem como um fator associado ao conhecimento em aleitamento materno. *Invest. educ. enferm* 2014; 32(1):139-417.
25. Scowitz IKT, Santos IS, Domingues MR, Matijasevich A, Barros AJD. Prognostic factors for low birthweight repetition in successive pregnancies: a cohort study. *BMC Pregnancy Childbirth* 2013; 20(13):1-8.
26. Restrepo-Méndez MC, Lawlor DA, Horta BL, Matijasevich A, Santos IS, Menezes AM, Barros FC, Victora CG. The association of maternal age with birthweight and gestational age: a cross-cohort comparison. *Paediatr Perinat Epidemiol* 2015; 29(1):31-40.
27. Alves ALN, Oliveira MIC, Moraes JR. Iniciativa Unidade Básica Amiga da Amamentação e sua relação com o aleitamento materno exclusivo. *Rev Saude Publica* 2013; 47(6):1130-1140.
28. Caminha MFC, Serva VB, Arruda IKG, Filho MB. Aspectos históricos, científicos, socioeconômicos e institucionais do aleitamento materno. *Rev. Bras. Saude Mater. Infant.* 2010; 10(1):25-37.

29. Hossain MI, Nahar B, Hamadani JD, Ahmed T, Brown KH. Effects of community-based follow-up care in managing severely underweight children. *J Pediatr Gastroenterol Nutr* 2011; 53(3):310-319.
30. Souza VB, Roecker S, Marcon SS. Educative actions in prenatal assistance: perceptions of pregnant women assisted at the Basic Health Unit of Maringá-PR. *Rev. Eletr. Enf.* 2011; 13(2):199-210.
31. Beeckman K, Lockx F, Putman K. Determinants of the number of antenatal visits in a metropolitan region. *BMC Public Health* 2010; 10(1):527-534.

Article submitted 23/04/2015

Approved 10/07/2015

Final version submitted 12/07/2015