

# Educational workshops about bonding with the fetus during pregnancy: a clinical trial



*Oficinas educativas sobre vínculo com o feto durante a gestação: um ensaio clínico*

*Talleres educativos sobre la vinculación con el feto durante el embarazo: un ensayo clínico*

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## ABSTRACT

**Objective:** To verify if participation in educational workshops about bonding with the fetus influences the adoption of practices of interaction with the baby by pregnant women.

**Method:** Randomized clinical trial conducted in a health clinic. The experimental group participated in educational workshops designed for the pregnant couple and the control group received usual care. The practices of interaction with the fetus were evaluated before and after the intervention.

**Results:** 19 pregnant women participated in the study. There was a positive correlation between higher gestational age and the interaction with the fetus ( $p = 0.016$ ), and between younger mothers and the practice of touching or poking the baby ( $p = 0.019$ ). There was an increase in the interaction with the fetus in the control and experimental groups ( $p = 0.024$ ).

**Conclusion:** Educational workshops are strategies for sharing knowledge about fetuses' sensory skills and to foster bonding and child development since pregnancy.

**Keywords:** Clinical trial. Health education. Maternal-child nursing. Parenting. Maternal-fetal relations. Child development.

## RESUMO

**Objetivo:** Verificar se a participação em oficinas educativas sobre vínculo com o feto influencia a adoção de práticas de interação com o bebê pelas gestantes.

**Método:** Ensaio clínico randomizado realizado em ambulatório de saúde. O grupo experimental participou de oficinas educativas desenvolvidas para o casal grávido, e o grupo controle recebeu acompanhamento de saúde usual. As práticas de interação com o feto foram avaliadas antes e depois da intervenção.

**Resultados:** Participaram do estudo 19 gestantes. Houve correlação positiva entre a maior idade gestacional e a interação com o feto ( $p=0,016$ ), bem como com a menor idade materna e a prática de mexer ou cutucar o bebê ( $p=0,019$ ). Houve aumento das práticas de interação com o feto tanto no grupo controle quanto no experimental ( $p=0,024$ ).

**Conclusão:** As oficinas educativas são estratégias de compartilhamento de saberes sobre as competências sensoriais do feto e as práticas fortalecedoras do vínculo e do desenvolvimento infantil desde a gestação.

**Palavras-chave:** Ensaio clínico. Educação em saúde. Enfermagem materno-infantil. Poder familiar. Relações materno-fetais. Desenvolvimento infantil.

## RESUMEN

**Objetivo:** Verificar si la participación en talleres educativos sobre vinculación con el feto influye en la adopción de prácticas de interacción con el bebé por parte de la mujer embarazada.

**Método:** Ensayo clínico aleatorizado realizado en una clínica de salud. El grupo experimental participó en talleres educativos desarrollados para la pareja embarazada y el grupo control recibió monitoreo de salud regular. Las prácticas de interacción con el feto fueron evaluadas antes y después de la intervención.

**Resultados:** 19 mujeres embarazadas participaron en el estudio. Hubo una correlación positiva entre una edad gestacional más alta y la interacción con el feto ( $p = 0.016$ ), así como entre madres más jóvenes y la práctica de tocar o empujar al bebé ( $p = 0.019$ ). Hubo un aumento en las prácticas de interacción con el feto tanto en el grupo control como en el experimental ( $p = 0.024$ ).

**Conclusión:** Los talleres educativos son estrategias para compartir el conocimiento sobre las habilidades sensoriales del feto y las prácticas de fortalecimiento del vínculo y el desarrollo infantil desde el embarazo.

**Palabras clave:** Ensayo clínico. Educación en salud. Enfermería materno-infantil. Responsabilidad parental. Relaciones materno-fetales. Desarrollo infantil.

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## INTRODUCTION

The period that extends from gestation to the third year of life of a child is the period in which they are affected the most by environmental influences. In this period, the bases are established that will define their health, wellbeing, learning, and productivity of the individual throughout their lives. Therefore, the promotion of child development must start during gestation, and families need support, knowledge, and time to provide the care that can promote the integral development of the child<sup>(1)</sup>.

In Brazil, the *Marco Legal da Primeira Infância* (the Legal Milestone of Early Childhood)<sup>(2)</sup> states that pregnant women and families with children in early childhood must receive guidance and training about responsible motherhood and fatherhood, among other themes, to aid in the formation and consolidation of affective interactions and encourage the integral development of early childhood.

When one considers that the fetus has tactile and auditive sensibility, the interactions between parents and the fetus, such as touches and conversation, favor the development of the child, starting in pregnancy<sup>(3)</sup>. The development of the senses of the fetus starts with touch, and throughout pregnancy, they develop taste, hearing, smell, and vision<sup>(4)</sup>.

The mother-fetus connection during the pregnancy is influenced by numerous factors. Among these factors, which are determinant in the connection between mother and baby during pregnancy, are the educational level, longer pregnancies, socioeconomic levels, a better romantic relationship between the parents, the use of illegal substances, maternal age, negative experiences in interpersonal relationships during pregnancy, the fear of birth, psychosocial factors such as unhappiness with pregnancy, unwanted pregnancy, stress, depression, and family support<sup>(5-6)</sup>.

In this context, educational workshops based on Popular Health Education<sup>(7)</sup> can represent a strategy to build knowledge and practices with first-time parents during pregnancy, based on such principles as dialog, love, raising questions, a shared building of knowledge, and the emancipation of individuals.

However, studies that evaluate the effects of educational workshops during pregnancy are rare. A study carried out with 105 pregnant women about the effects of an educational workshop, addressing themes related to pregnancy, birth, breastfeeding, and care to the newborn found that educational workshops are important strategies to improve the knowledge of pregnant women about perinatal themes<sup>(8)</sup>.

The guiding question of this research was: "Do pregnant women who participate in educational workshops about

their connection to the fetus adopt more practices to interact with the baby when compared to those who do not participate in said workshops?" The hypothesis of this study is that participating of educational workshops that encourage the maternal-fetal bond influences the interaction between the pregnant woman and her baby.

The objective of this study was checking whether the participation in educational workshops about the bond with the fetus influences pregnant women to interact more with the baby.

## METHOD

This is a randomized clinical trial. Randomized clinical trials give support to health workers and decision makers with regard to the compared efficacy and safety of treatments<sup>(9)</sup>. This study tested whether the participation in educational workshops about the bond with the fetus (intervention) efficiently encouraged pregnant women who participated in the workshops (experimental group) to adopt practices of interaction with their babies (outcome) when compared to pregnant women who did not participate in the workshop (control group).

The study was carried out in a health outpatient clinic from a philanthropic health care center in a region of São Paulo that is highly socially vulnerable. This clinic provides primary health care, including monitoring consultations carried out by nurses, physicians, nutritionists, psychologists, social workers, pharmacists, and dentists, especially for children, adolescents, and women. It also offers routine laboratory exams, pharmacy services, immunization, the administration of drugs, and wound dressings.

Participants were selected from a list with the name of pregnant women whose health was being monitored by the obstetrician in this service. The inclusion criteria of the participants were: being in the second or third trimester of pregnancy or the partner of a pregnant woman in the same condition, when she wanted; and being pregnant with their first child, undergoing regular prenatal care in the health service. Were excluded those that were suspected or diagnosed with severe mental disorders.

A convenience sample was carried out by nineteen pregnant women who fulfilled the selection criteria and accepted participation in the study. They were randomly selected, according to a randomized list. The control group received a normal health follow up, with individual consultations carried out by the obstetrician. In the experimental group, in addition to regular health follow up consultations, the pregnant couple was invited to participate in educational workshops (intervention).

Three educational workshops were carried out, one per month in three consecutive months, each lasting from 60 to 90 minutes. The workshops were carried out by three pediatric and obstetric nursing professors from a public university and a private school, nurses from the outpatient health clinic, and undergraduates from the nursing course, who were part of a university extension project. In the last workshop, the pregnant couples were invited to share how was their experience of participating in the workshops. Each workshop is presented in Chart 1.

The theoretical framework adopted was related to The Irreducible Needs of Children<sup>(10)</sup>, focusing on the need for continuous and fulfilling relationships. This need highlights the importance of the constant presence of a person who is the main responsible for the care of the child. Fulfilling and caring interactions between caregiver and child are paramount for the adequate development of the central nervous system of the child, providing them with bases for learning and the capacity to form relationships throughout their lives.

The technical references used for the intervention were the Strengthened Brazilian Family Kit, produced by UNICEF<sup>(11)</sup>, and the notebook on prenatal formation, puerperium, birth, and breastfeeding: expanded practices, from the *Programa São Paulo pela Primeiríssima Infância* (the São Paulo Program for Very Early Childhood<sup>(12)</sup>), since these give support to the intervention of health professionals who work in the primary health for the promotion of their parenthood, and for the bonding with the child, since gestation.

The variables to characterize the population of the study were: age, educational level, profession, marital status, per capita income, welfare, planned pregnancy, whether they received emotional support during the pregnancy and from whom, and gestational age.

The depending variable was the interaction with the fetus, which was evaluated according to the items about the interaction of the mother with the fetus in the Mother-Infant Bonding Scale<sup>(16)</sup>, which was developed to assess the bond between the pregnant woman and the fetus from the second trimester of pregnancy on, and validated for its use in the Brazilian population. This outcome was evaluated before and after the start of the intervention in a structured interview, which investigated the performance of five practices, verifying whether: the mother talks with the fetus, the father talks to the fetus, the mother plays or touches the fetus through the belly, the mother calls the fetus using some nickname or name. Each interactive practice received a score according to its frequency in the last week, with values

from five to one. The score was 5 when actions were carried out every day; 4 when in most days; 3 when in some days; 2 when rarely; or 1 when never. The score of the interaction practices varied from 5 to 25.

The intervention and data collection took place from August to December 2018. Data were analyzed using SPSS 21.0 IBM® and the GraphPad Prism 5.0. The analysis was done considering the intention to be treated, that is, individuals randomly selected for the experimental group were analyzed only when they went to at least one meeting of the educational workshop. The control group was formed by those randomly selected to it and those who at first were assigned to the experimental group but did not go to any meetings. For the analysis of data normality, the Kolmogorov-Smirnov and Shapiro-Wilk tests were used. For numerical variables, the numbers were expressed in median, and 25 and 75 percentiles. When comparing the experimental and control groups, numerical variables were tested using the Mann-Whitney test for two independent samples or Wilcoxon's test. The categoric variables are presented as absolute or relative frequencies and were tested using Pearson's chi-squared or Fisher's exact. The statistical significance level was  $p \leq 0.05$ .

This study subscribes to national and international ethical norms in researches with human beings. The participants were informed about its objectives and signed the Free and Informed Consent Form (FICF). The project was approved by the administration of the health care center and by the Research Ethics Committee at the Universidade Federal de São Paulo (Opinion nº 2.822.540, CAEE 93551318.0.0000.5505). The research was registered in the Brazilian Record of Clinical Essays (U1111-1219-1355).

## ■ RESULTS

24 pregnant women were invited, from which 5 refused participation, meaning that 19 were part of the study. From them, 9 were selected for the control group and 10 in the experimental one, according to the randomized list. 6 pregnant women from the experimental group did not go to the meetings. Therefore, 15 were analyzed as a control group, and 4 as an experimental one. 10 of them did not participate in the collection after the intervention, and their data was lost. The reasons for that were: birth of the baby (60%), it was not possible to get in touch in person or via telephone (30%), and miscarriage (10%), with no statistical difference between the groups ( $p=0.49$ ). The flowchart of participants is in Figure 1.

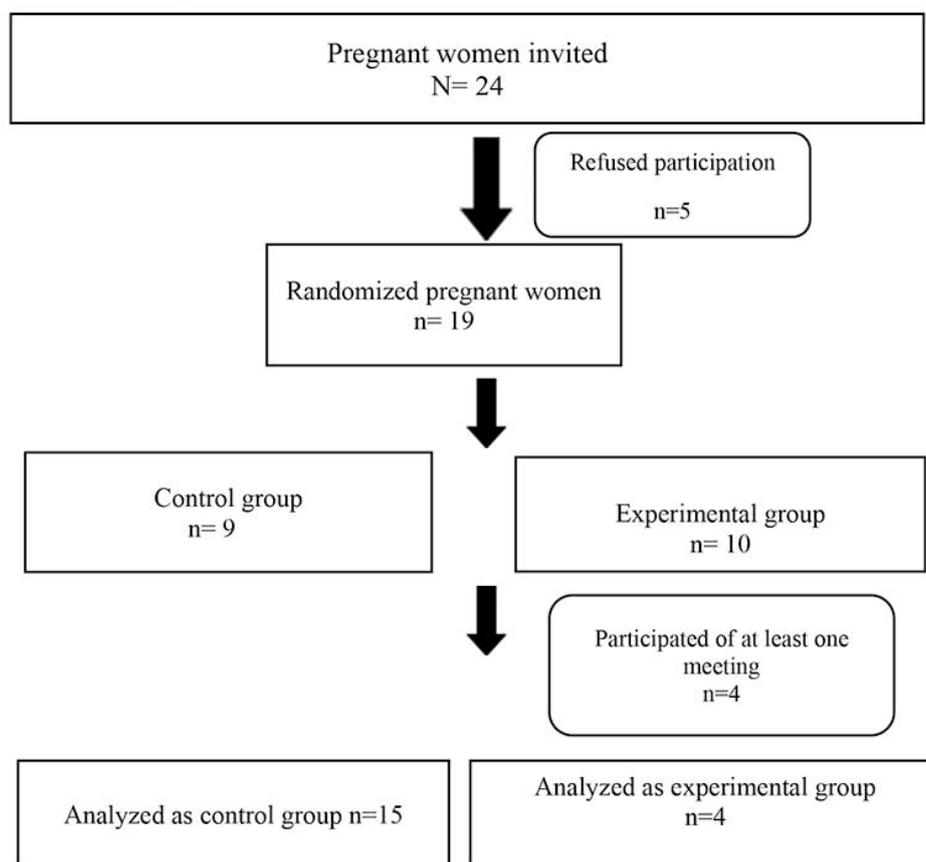
Meeting	“Ice break” group activity 10-15 min	Sharing group activity 20-30 min	Integration group activity 20-30 min	Wrap up 15 min
1st meeting: The importance of interaction for the development of the child from the gestation from.	Memory game: learning the names of the participants.	Trigger: exhibiting the video “Physical and Emotional Changes in the Pregnant Woman: What to Do?”(13).  Conversation round: What part of the video called the most attention to each participant? Why?	Constructing a tree with sentences elaborated by the participants and representative images of the bond between the couple and their child (talking, reading a book, singing, and touching the belly).	Relaxation exercise through deep inhalation and exhalation.
2nd meeting: The development of the five senses during pregnancy	Shoulder massage activity: each of us does as well as they can.	Trigger: exhibiting the video: “The Senses of the Baby During Pregnancy”(14)  Conversation round: What part of the video called the most attention to each participant? Why?	Activity with images of the fetus in different moments of pregnancy, the development of the five senses (touch, taste, hearing, smell, and vision) and ways to interact, such as talking, singing, and touching the belly.	Relaxation exercise: stretching.
3rd meeting: I am going to be a father or mother, what now?	Conversation round about the expectations related to the arrival of the baby	Trigger: exhibition of the video “In Utero Development”(15).	The discussion was in accordance with the needs of the participants and there was a simulation of the care provided to the newborn using a doll: bath, breastfeeding, and good practices when visiting the newborn.	Goodbye hug, and evaluation of the workshop by participants.

**Chart 1** – Description of the educational workshops about the bond with the fetus for first-time couples. São Paulo, 2018  
Source: the authors, 2018.

Regarding the sociodemographic characteristics of these 19 pregnant women, their age varied from 14 to 35 years old, with a median of 20. Most participants had completed high school (68.4%), were married (57.8%), felt they had the support of the father of the baby and other relatives (66.7%), were in an unplanned pregnancy (63.1%), and did not work (57.9%). The sociodemographic characteristics are described in Table 1. They were homogeneous when comparing the control and experimental group, and, as a result, it was possible to compare the interaction with the fetus between the groups. The only difference between the groups educational level. The

experimental group had more participants with elementary education and higher education, while the control had more women with completed high school.

Regarding the workshops to promote the bond with the fetus, the ten participants initially selected for the experimental group and their partners were invited to participate in three workshops about the bond with the fetus. 40% participated of at least one meeting. One pregnant couple (mother and father) participated in the three meetings proposed and three pregnant women (only the mother) participated of a single meeting.



**Figure 1** – Flowchart of the participants of the study. São Paulo, 2018

Source: research data, 2018.

During the meetings, the participants shared their previous experiences caring for children from the neighborhood or from relatives and expressed doubts about breastfeeding (when does breast milk starts to appear, the use of baby bottles, the offer of artificial milk), techniques to bathe the baby, the products recommended for body hygiene, and the best moment for relatives and friends to visit the newborn. In the workshop about the development of the five senses in the fetus, the participants were surprised to find that the fetus can feel touches in the belly and can listen and see within the uterus. There was a shared construction of knowledge in a dialog between the health professionals and participants about the sensory capabilities of the fetus and the ways in which they can interact with the fetus during the pregnancy to form a bond. In the evaluation of the participants, the themes of the workshop were found to be interesting, since they did not know the characteristics of the development of the five senses in the fetus.

Regarding practices of interaction with the fetus, Figure 2 showed that there was a positive correlation between a higher gestational age and an increase in the score of

practices of interaction with the fetus; there was also a correlation between younger mothers and the practice of touching or poking the baby. There was no difference related to the marital status of the participants in regard to the behavior analyzed.

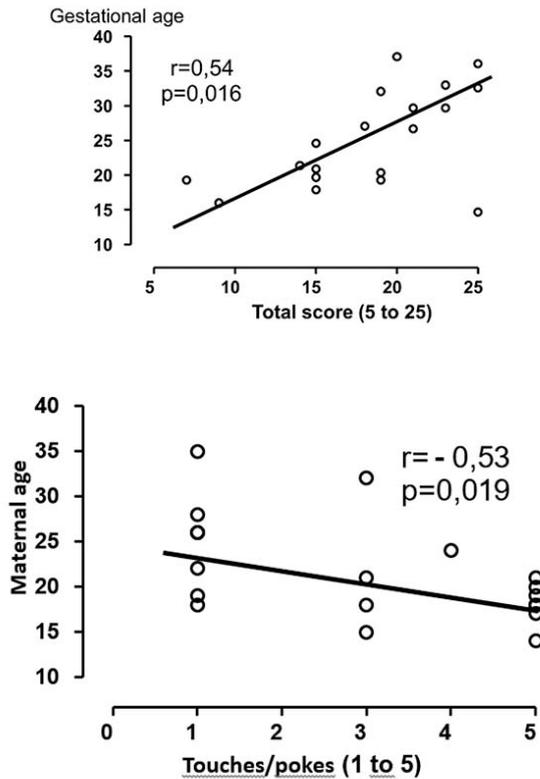
The practices of interacting with the fetus were evaluated before and after the educational workshops. The mean score regarding practices of interaction with the fetus in the participants went from 19 to 23 after the intervention ( $p=0.024$ ). The practices of interaction with the fetus and the total score before and after the intervention for the participants in the control and experimental groups are presented in Table 2.

There was an increase in the interaction with the fetus after intervention, both in the control group and in the experimental one. In the control group, the mothers started to touch and poke the baby significantly more ( $p=0.04$ ); there was also a significant increase in the total score of interactions with the fetus ( $p=0.02$ ). In the experimental group, there was an increase in the interaction of the mother with the fetus, and the only interaction that diminished was the father talking to the baby.

**Table 1** – Sociodemographic characteristics of the participants from the control and experimental groups. São Paulo, 2018

Group	Control (n=15)		Experimental (n = 4)		P-value	
	median	25%-75%	median	25%-75%		
<b>Age</b>	19.0	18.0-26.0	21.0	17.5-27.0	0.763	
<b>Income</b>	2.000	1.000 – 3.000	2.500	2.000 – 3.000	0.653	
<b>Gestational age</b>	51.4	19.3-32.6	28.2	23.0-30.9	0.689	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		
<b>Profession</b>	employed	8	53.3%	0	0.0%	0.055
	unemployed	7	46.7%	4	100.0%	
<b>Type of family</b>	expanded	8	53.3%	3	75.0%	0.435
	nuclear	7	46.7%	1	25.0%	
<b>Support Emotional</b>	no	1	6.7%	0	0.0%	0.596
	yes	14	93.3%	4	100.0%	
<b>Support from the father of the baby and relatives</b>	no	4	28.6%	2	50.0%	0.423
	yes	10	71.4%	2	50.0%	
<b>Family support</b>	no	3	21.4%	1	25.0%	0.880
	yes	11	78.6%	3	75.0%	
<b>Support from the father of the baby</b>	no	1	7.1%	1	25.0%	0.316
	yes	13	92.9%	3	75.0%	
<b>Marital Status</b>	married	9	60.0%	2	50.0%	0.719
	single	6	40.0%	2	50.0%	
<b>Elementary school</b>	no	14	93.3%	2	50.0%	0.035
	yes	1	6.7%	2	50.0%	
<b>Ensino médio</b>	no	2	13.3%	4	100.0%	0.001
	yes	13	86.7%	0	0.0%	
<b>Ensino superior</b>	no	14	93.3%	2	50.0%	0.035
	yes	1	6.7%	2	50.0%	
<b>Current pregnancy planned</b>	no	9	60.0%	3	75.0%	0.581
	yes	6	40.0%	1	25.0%	

Source: research data, 2018.



**Figure 2** – Correlation between the gestational age and the practices of interacting with the fetus, and between the mother’s age and the practice of touching or poking the baby. Data expressed as correlation ( $r$ ) and significance ( $p$ ) indexes. São Paulo, 2018

Source: research data, 2018.

## ■ DISCUSSION

The care that can be taken to promote the integral development of the child starts before birth, when mothers and other caregivers can talk and sing to the fetus, since, at the end of the second trimester of the pregnancy, the fetus can listen and feel touches<sup>(4)</sup>. Since pregnancy, the child needs positive interactions, because the construction of cerebral circuits is mediated by the quality of socio-affective relations, especially by the interactions established with the caregivers<sup>(17)</sup>.

This study found that educational workshops based on Popular Health Education contribute to increase the knowledge of primigravidas or first-time parents about the sensory capabilities of the fetus, and the practices of interaction with the baby during pregnancy. Therefore, it is important for health professionals in the care services to leave behind the naturalized position according to which maternity is a “natural” ability, related to instinctive reactions<sup>(17)</sup>. Giving support to the construction of an affective bond with the

fetus, both for mother and father, is a challenge to be beat for the promotion of early childhood.

The results have shown a positive correlation between higher gestational age and more interaction with the fetus, and also that younger mothers touch and poke the baby more. Furthermore, it was found that, after the intervention period, there was an increase in the interaction of the mother with the fetus, in practices such as talking to the fetus, calling by a name or nickname, caressing the belly, and touching and poking. This was true for both the experimental and control groups.

These practices of interaction with the baby are representative of the start of fulfilling and continuous relationships between a child and their progenitors. Finding this behavior in both groups is a promising result, since it shows a positive affection towards the fetus. Establishing this type of relationship is essential for an adequate development of the central nervous system and child learning. It also aids in the development of emotional safety and in the establishment of future relationships<sup>(10)</sup>.

In this regard, the findings of this study corroborated the importance of interventions to promote child development, starting in pregnancy. A study that investigated the emotional implications of obstetric ultrasonography for the mother-fetus relation found that the ultrasonography increased the interaction between mother and baby, expressed in touches to the belly, talking to the baby, and noticing their movements, significantly increasing the mean of the scores of the bonding scale<sup>(18)</sup>. Similarly, a Turkish study carried out with 100 pregnant women attempted to evaluate mother-fetus interaction by using Leopold maneuvers as an intervention. It found that, after the intervention, 94% of the pregnant women started to talk to the fetus, and 60% started to play music to listen and to interact with the fetus<sup>(18)</sup>. Literature<sup>(18-19)</sup> reiterates that it is important for health workers to invest in the sharing of knowledge about the capabilities of the fetus and the ways in which one can interact with them, aiming to promote the development and construction of a bond between parents and child since pregnancy.

The results of this study showed that the father never or rarely interacted with the fetus and had a reduced participation in education workshops. Corroborating these findings about the scarce participation of fathers in the prenatal, a research with nurses and physicians who work with prenatal consultations in the family health strategy found that fathers usually do not go to consultations, even when invited by physicians or offered notes attesting they went to the consultations<sup>(20)</sup>. Furthermore, a research carried out with 20 first-time parents found that me remain distant from the attention of health workers and from the need to deal with public health policies and to insert gender perspective in the policies and practices of health and education, to

**Table 2** – Practices of interaction with the fetus before and after intervention. São Paulo, 2018

Control group	Before intervention			After intervention			P-value
	Median	25%	75%	Median	25%	75%	
<b>The mother talks to the baby</b>	3.0	5.0	5.0	4.5	5.0	5.0	0.102
<b>The mother calls the baby using a name or nickname</b>	1.0	5.0	5.0	5.0	5.0	5.0	0.999
<b>The father talks to the baby</b>	1.0	3.0	5.0	2.5	5.0	5.0	0.059
<b>The father caresses the belly</b>	5.0	5.0	5.0	4.8	5.0	5.0	0.655
<b>The mother touches or pokes the baby</b>	1.0	3.0	5.0	5.0	5.0	5.0	0.041
<b>Score (5 to 25)</b>	15	19	23	22	24	25	0.027
Experimental group	Median	25%	75%	Median	25%	75%	P-value
<b>The mother talks to the baby</b>	1.5	3.0	4.5	3.0	4.0	5.0	0.317
<b>The mother calls the baby using a name or nickname</b>	2.0	5.0	5.0	5.0	5.0	5.0	0.250
<b>The father talks to the baby</b>	1.5	3.0	4.5	1.0	3.0	3.0	1.000
<b>The father caresses the belly</b>	3.5	5.0	5.0	5.0	5.0	5.0	0.317
<b>The mother touches or pokes the baby</b>	1.5	3.0	4.5	2.0	3.0	5.0	0.655
<b>Score (5 to 25)</b>	10	20	23	17	20	22	1.000

Source: research data, 2018.

form professionals that are sensible to act with these men, contributing to promote more egalitarian forms of life that can be beneficial to the man-father<sup>(21)</sup>.

Regarding the interaction between father and fetus, it was uncommon, even after the educational intervention with the experimental group. Therefore, the need to encourage the early establishment of a bond between father and child must be highlighted, as a way to encourage fatherhood and establish fulfilling and continuous relations since pregnancy<sup>(17)</sup>.

The father-child bond, during early childhood, can contribute for the reduction of behavior problems, such as aggressivity and emotional symptoms, in addition to aiding in the development of social competences. It should be mentioned that this role does not need to be occupied by the biological father of the child, but by a caregiver that can establish a bond with the child and occupy this space<sup>(17)</sup>.

This study showed that it is necessary to invest in prenatal practices that encourage interaction with the fetus and the construction of a bond between parents and baby. This

has implications on nursing, which include the important role of health education for first-time parents regarding the characteristics of fetal development according to gestational age, with the objective of promoting interactive practices that give support to the creation of fulfilling and continuous relationships with the child since pregnancy, to promote a good development of the child. A strategy to do so involves the promotion of the bond between parents and babies during pregnancy, which can be carried out in prenatal consultations, educational groups, and public health campaigns.

This study made it possible to recognize the needs pregnant couples have for information, contributing for the creation of an intervention. It also showed difficulties in the adherence of participants, which may have been influenced by the fact that the workshops took place during the week, in the afternoon. Furthermore, the study showed the need to use a broader instrument to measure the bond between mother and fetus, since only some items of the Mother-Infant Bonding Scale were used.

## CONCLUSION

Our results found that, after intervention, there was an increase in the interaction of the mother with the fetus, in practices such as talking to the fetus, calling them by a name or nickname, caressing the belly, and touching and poking. This was true for both the experimental and control groups. In the experimental group, conversations of the father with the fetus became less frequent after the intervention. Younger mothers and those with higher gestational age interacted mother with the fetus. Our study showed the role of educational workshops for the construction of the knowledge of primigravidas and first-time couples about the sensory capabilities of the fetus, and the ways to interact and form bonds with them, to promote their development since pregnancy.

Although this study innovates as it proposes educational workshops about bonds with the fetus for primigravidas, it has limitations. These include the small sample size, the low adherence of the participants in the experimental group, and the losses of participants as the study progressed. Future studies should consider the need for longer interventions following the postpartum period. They should also use virtual communication channels to implement the intervention with the participants.

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