

*UNIVERSITY OF MEDICINE AND PHARMACY  
"CAROL DAVILA" of BUCHAREST*

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**UNIVERSITY OF MEDICINE AND PHARMACY  
"CAROL DAVILA", BUCHAREST  
DOCTORAL SCHOOL  
FIELD OF GENERAL MEDICINE/OBSTETRICS AND GYNAECOLOGY**

## **DOCTORAL THESIS**

**PhD supervisor:  
PROF. UNIV. DR. PLEȘ LIANA**

**PhD. Candidate:  
GOLEA (BALASOIU) ANCA-MARIA**

**2023**

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**"THE IMPACT OF PRE- AND POST-NATAL  
COUNSELLING ON THE HEALTH OF PREGNANT  
WOMEN"**

**ABSTRACT OF DOCTORAL THESIS**

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## **Introduction**

The PhD thesis entitled "The impact of pre- and post-natal counselling on the health of pregnant women" is a scientific approach carried out with the aim of assessing the impact of prenatal education on behaviors and skills related to newborn care and breastfeeding, as well as on the health of the whole family.

Pre-natal education has a long history in the world, influenced by culture, traditions and the medical knowledge available at different times.

At present, prenatal education services in Romania are offered mainly in urban areas by various obstetric units, private clinics and non-governmental organizations. The topics covered in such courses are chosen by the midwives or clinicians involved in supporting them, according to their own will and professional experience. However, the high demand for prenatal education from expectant parents demonstrates the need to develop this type of service and to promote their importance among pregnant women and the medical community. (Balasoiu A. M. & Ples.L, 2021).

In order to understand the prenatal education needs of each couple and the effects of prenatal education on their behaviors, we found it necessary and useful to investigate some of the important aspects of prenatal education. The arguments presented above have been the basis of the three studies that make up the current PhD thesis and whose details I will present in the following chapters.

### **I. GENERAL PART**

#### **1. Maternal body changes in pregnancy**

The adaptive changes that the maternal body undergoes in pregnancy result in supporting fetal growth and development. Knowledge of these anatomical, physiological and biochemical changes is important in order to correctly identify the presence of a pathology (Cunningham, și alții, 2018).

Complex changes in lipid, carbohydrate and protein metabolism occur during pregnancy (Lain & Catalano, 2007). Both anatomical and physiological changes are also found in the cardiovascular system (Thilaganathan & Kalafat, 2019) (Perry, Khalil, & Thilaganathan, 2018).

The development of the uterus in pregnancy causes the diaphragm to ascend, with a slight increase in the thoracic diameters and a change in the angle between the ribs and the

spine. These anatomical changes do not affect the function of the respiratory system (DeCherney, Nathan, Laufer, & Roman, 2013) (Tan & Tan, 2013).

About 50-90% of pregnancies are associated with the presence of nausea and vomiting. The mechanism of these phenomena is not fully understood. Possible aetiologies are oestrogens, progesterone, human chorionic gonadotropin (hCG), thyroid hormones, immunological factors or the presence of *Helicobacter pylori* infection (Soma-Pillay, Nelson-Piercy, Tolppanen, & Mebazaa, 2016).

In order to ensure the breastfeeding process, serum prolactin levels rise as pregnancy progresses. The pituitary gland also produces the synthesis of anti-diuretic hormone (ADH) but also oxytocin, the level of which increases progressively until birth. (Tan & Tan, 2013).

In order to maintain the centre of gravity of the pregnant woman above the support zone represented by the lower limbs, a compensatory hyperlordosis occurs that progresses with the growth of the uterus. At the same time, the sacroiliac and pubic joints are characterized by increased mobility (Cunningham, și alții, 2018) (Soma-Pillay, Nelson-Piercy, Tolppanen, & Mebazaa, 2016).

There are no significant changes in the central nervous system. It has been observed that pregnant women may have various problems with memory, concentration and attention, which may continue into the early pregnancy period (Cunningham, și alții, 2018).

## **2. Physiological pregnancy**

Most commonly, the age of pregnancy is calculated using the date of the last menstrual period as a reference and expressed in weeks of gestation. Approximately 10-45% of pregnant women do not know the date of their last menstrual period, in which case an ultrasound in the first trimester of pregnancy and measurement of the embryo become very important to date the pregnancy (Geirsson & Busby-Earle, 1991).

The duration of pregnancy is 40 full weeks or 280 days, corresponding to ten menstrual cycles. Post-term birth is birth after 42 weeks of amenorrhoea. The risk of neonatal mortality increases progressively after 40 weeks gestation (DeCherney, Nathan, Laufer, & Roman, 2013).

Due to the hormonal changes that occur during pregnancy, hyper-pigmentation is more pronounced, especially in the breast areolae and nipples, the white line, as well as in the external genitals, newly formed scar areas or the medial area of the thighs. This pigmentation gradually reduces in the first months after birth (Snarskaya, și alții, 2019).

### **3. Newborn at term**

A normal weight newborn weighing between 2800g and 4000g at birth is considered a term newborn if the birth occurred between 38 and 41 weeks gestation. It has a birth length of 48 - 52 cm, a head circumference of approximately 34 - 36 cm and a chest circumference of 32 - 34 cm.

Each newborn is assessed at birth using the Apgar score at 1 minute and 5 minutes after birth. It includes 5 parameters: skin color, respiratory effort, heart rate, muscle tone and responsiveness to stimuli. Each parameter is given a value from 0 to 2.

Initiating the newborn's breathing should happen immediately after birth. The newborn's temperature should be measured at the axilla and should range between 36.5°C and 37.5°C if not placed in an incubator. The newborn's respiratory rate varies between 35 and 60 breaths per minute (Tveiten, Diep, Halvorsen, & Markestad, Respiratory Rate During the First 24 Hours of Life in Healthy Term Infants, 2016). Newborn heart rate ranges from 102 - 162 beats per minute, with the 50<sup>th</sup> percentile being 120 beats per minute (Tveiten, Diep, Halvorsen, & Markestad, Heart rate during the first 24 hours in term-born infants, 2021).

After the newborn is assessed, a number of routine procedures should be performed including hepatitis B vaccination, prophylaxis of eye infections, administration of vitamin K, care of the umbilical stump to prevent the development of infections, and monitoring of metabolic changes to detect the presence of hypoglycemia or hyper-bilirubinemia (Cunningham, et al., 2018).

It is recommended that breastfeeding is the only way of feeding the newborn and should be maintained as the exclusive form of feeding until the age of 6 months, thereafter until the age of 2 years the diet can be supplemented with various foods (Mazo-Tomé & Suárez-Rodríguez, 2018) (Bellù & Condò, 2017).

## **I. ORIGINAL PART**

### **4: Working hypothesis and general objectives**

Prenatal education can play a key role in ensuring quality care during pregnancy and facilitating access to appropriate health services (Balasoïu, A. M., Pomana, C. D., Sima, R. M., & Ples, L., 2021). Numerous studies have highlighted the importance of prenatal

education as a tool for health promotion and suggested that it should be central to public prenatal strategies. (BalasoIU AM, Olaru OG, Sima RM, Ples L., 2021)

**Work hypothesis:** Participation in prenatal education programmes has a positive impact on pregnant women and mothers, leading to better preparation and adaptation during pregnancy, increased breastfeeding rates, as well as partner and family involvement in caring for the newborn.

**The overall objectives** of the paper are to explore and identify the personal characteristics of pregnant women and mothers, to discover the level of interest in prenatal education and the influence of these courses on the care and breastfeeding skills of the newborn/infant.

**Specific objectives** To assess the level of knowledge and information about pregnancy care, birth preparation and motherhood among pregnant women and mothers participating in the prenatal education course; to discover the impact of prenatal education on pregnancy care, newborn care and breastfeeding support and on father/partner and family involvement; identifying the needs of pre- and post-natal education for pregnant women and mothers.

#### **4.1. Research directions.**

In the present research, the aim is to explore and identify the specific needs of pregnant women and women who have given birth, as well as their interest in prenatal education and how they can be met by it.

## **5. General research methodology**

### **5.1. General study protocol**

Data collection for the study "The impact of pre and postnatal counselling on pregnant women's health" was conducted from 25 June 2020 to 07 September 2021. The research focused on the impact of prenatal education on the health of the pregnant woman and the woman who gave birth.

From a methodological point of view the research involved a prospective cohort study.

The research instruments used were two questionnaires: Questionnaire 1 (Annex 1) and Questionnaire 2 (Annex 2). The first questionnaire included questions for pregnant women, the second included questions for women who had given birth. The questions were of the grid and open-ended type with one or more options multiple choice answers.

A total of 565 women (pregnant women and mothers) who responded to at least one of the two questionnaires were included in the study group. The first sample of 460 pregnant



women and the second sample of 230 women who gave birth were analyzed separately to see what the overall results were, as well as the responses from the third sample of 125 respondents who filled both questionnaires. In this way the results were compared to assess the differences between categories, and the results were divided into three studies.

**5.2. Statistical analysis of the data** - IBM SPSS Statistics 21 was used to perform the statistical analysis.

## **6. Study I: "Educational needs of pregnant women"**

### **6.1.Introduction**

The study aimed to identify the educational needs of pregnant women according to pregnancy parity and to assess the degree of partner and family involvement during pregnancy.

**Work hypothesis:** The educational needs of pregnant women are different and the degree of partner involvement varies according to parity and level of prenatal education and training.

**General objectives:** to identify significant differences between pregnant women primary-parous and multi-parous, but also their educational needs; to identify the degree of partner involvement in supporting the newborn/breastfeeding needs of first-time versus repeat pregnant women; to assess the level of interest of pregnant women in prenatal education.

**6.2. Material and method:** the study group consisted of 460 women who answered a questionnaire addressed to pregnant women from 25 June 2020 to 7 September 2021.

**Inclusion criteria:** pregnant women in the first, second and third trimester of pregnancy; age over 18.

**Exclusion criteria:** patient's refusal to be included in the study; pregnant women under 18 years of age.

**Parameters analyzed: demographic indicators** such as: age, educational level, place of residence, usual habits: diet, smoking and **psycho-behavioural indicators:** mode of childbirth, intention and motivation to participate in pre- and post-natal education courses and involvement of partners and family, interest in topics covered in prenatal courses, interest in breastfeeding and expected period, knowledge of signs of postpartum depression and its occurrence, occurrence of problem situations after childbirth.

### 6.3.Results:

The following parameters were analyzed: background and preference for type of birth,  $\chi^2=3,914$ ,  $p=0,048$ , (-0,092) weak link ( $p=0,048$ ); pregnant woman at first pregnancy and her preference for mode of birth,  $\chi^2=13,565$ ,  $p\leq 0,001$ , (-0,172), weak link ( $p\leq 0,001$ ); pregnant woman's background and her preference for mode of birth.  $\chi^2=3.914$ ,  $p=0,048$ , (-0,092) weak link ( $p=0,048$ ); education level and smoking incidence,  $\chi^2=25,661$ ,  $p\leq 0,001$ , (0,236), weak link ( $p\leq 0,001$ ); first pregnancy pregnancy and choice of mode of delivery,  $\chi^2=13.565$ ,  $p\leq 0,001$ , (-0,172); weak link ( $p\leq 0,001$ ); prenatal education course attendance and level of education,  $\chi^2=39.383$ ,  $p=0,001$ , (0,293) (0,169) weak link ( $p=0,001$ ); intention to attend course and pregnant at first pregnancy,  $\chi^2=42.572$ ,  $p\leq 0,001$ , (0,304) weak-moderate link ( $p\leq 0,001$ ); attending the course with partner and first pregnancy,  $\chi^2=11.280$ ,  $p=0,004$ , (0,157) weak link ( $p=0,004$ ); partner's attendance at the course and preferred type of birth,  $\chi^2=12,463$ ,  $p=0,002$ , (0,165) weak link ( $p=0,002$ ); need for support from a breastfeeding specialist and first pregnancy,  $\chi^2=13,423$ ,  $p=0,004$ , (0,225) weak link ( $p=0,004$ ); support from the midwife regarding breastfeeding and first pregnancy  $\chi^2=10,180$ ,  $p=0,017$ , (0,149) weak link ( $p=0,017$ ); need for support from a breastfeeding specialist and first pregnancy,  $\chi^2=13,423$ ,  $p=0,004$ , (0,225) weak link ( $p=0,004$ ); desired period of breastfeeding and first pregnancy  $\chi^2=20,937$ ,  $p=0,002$ , (0,213) weak link ( $p=0,002$ ); level of education and intention to attend,  $\chi^2=39.383$ ,  $p=0,001$ , (0,169); partner's attendance at prenatal education course and parity,  $\chi^2=11.280$ ,  $p=0,004$ , (0,157); attendance at course with partner and preference for mode of delivery,  $\chi^2=12.463$ ,  $p=0,002$ , (0,165); need for breastfeeding support (from a professional) and parity of pregnancy  $\chi^2=13,423$ ,  $p=0,004$ , (0,225); knowledge of signs of postpartum depression and pregnancy parity,  $\chi^2=11,176$ ,  $p=0,004$ , (0,156); knowledge of signs of postpartum depression and educational level of the pregnant woman,  $\chi^2=25,120$ ,  $p=0,005$ , (0,234) weak link ( $p=0,005$ ); postpartum depression (whether the pregnant woman thinks she will be affected) and age group,  $\chi^2=34,369$ ,  $p\leq 0,001$ , (0,274) weak to moderate relationship ( $p\leq 0,001$ ); knowledge of postpartum depression signs and first pregnancy,  $\chi^2=11,176$ ,  $p=0,004$ , (0,156) weak relationship ( $p=0,004$ ).

### 6.4.Discussions

High receptivity of respondents with higher education and aged up to 30 years indicates that young, university-educated pregnant women are more likely to participate in prenatal education courses (Vanderlaan, J., & Kjerulff, K. , 2022). These data highlight that

prenatal education programmes need to focus particularly on low socioeconomic women (Milcent, C., & Zbiri, S., 2018).

There are a multitude of factors that influence women's preference for mode of delivery (Sys, 2021) we found that urban pregnant women had a slight tendency to prefer a natural birth to a caesarean birth, while rural pregnant women preferred a caesarean birth. Also, first-time pregnant women have a slight tendency to prefer a natural birth to a caesarean birth, while those who are not pregnant for the first time prefer a caesarean birth to a natural birth.

A statistical association was observed between educational attainment and choice to smoke, suggesting that college-educated pregnant women were less likely to be found to be smokers compared to pregnant women with primary or secondary education who were more likely to be smokers (Zhou, 2022).

Pregnant women's willingness to attend prenatal classes increases with their level of education (Ben Natan, 2016). The most frequently cited reason for attending the course was the desire to be informed.

Partner's attendance at prenatal education is more common in first-time pregnant couples compared to non-pregnant couples. These results suggest that it is necessary to introduce and adapt the information provided in prenatal education courses so that they address the whole family, but also their particularities (Finlayson, 2023). Also, the presence of the partner in the prenatal education course is more common in couples where the pregnant woman wants to give birth naturally, compared to those where the pregnant woman wants to give birth by caesarean section. Other studies in the literature have shown that prenatal education increases fathers' empathic tendencies, and the effects of prenatal education continue into the postpartum period, positively affecting paternal bonding (Gün Kakaşçı, 2022).

We have observed that the need for support is higher among first-time mothers compared to those who have given birth before and felt that they would not need or it would not be applicable to seek support. The literature has shown that exclusive breastfeeding is influenced by several factors (intention, age, education, parity), but prenatal counselling was the only health care variable that was associated with longer duration of breastfeeding (Duarte Lopes, 2022), (Li, 2022).

We have noticed that pregnant women who have given birth before are more knowledgeable than pregnant women who were pregnant for the first time. This fact highlights the need to consider assessing the development of postpartum depression as early

as during pregnancy in order to tailor prenatal care (Artieta-Pinedo, 2023). The lack of information about the symptoms of postpartum depression, the ignoring of this condition as a serious pathology of the childbirth period are all the more serious because, as our study shows, the lower the level of socioeconomic education, i.e. of those who are more exposed to this situation.

We investigated the respondents' opinion of prenatal classes and found that the number of those who recommended attending classes was in the majority. Moreover, most of them felt that this type of courses would be useful or should be compulsory for future parents. These results highlight the need for expectant parents to receive information and support about the pre- and post-natal period (Soysal Cimen, 2022).

### **6.5.Partial conclusions:**

1. Pregnant women who are pregnant for the first time prefer, to a greater extent, to give birth vaginally, while pregnant women who are not pregnant for the first time prefer to give birth by caesarean section.

2. Pregnant women with post-secondary or higher education are more interested in a pre- and post-natal education course compared to pregnant women with secondary education.

3. First-time pregnant women tend to be more interested in pre- and post-natal education courses than those who have already given birth.

4. Partner's attendance at pre- and post-natal education is more common in couples where the pregnant woman is having her first pregnancy compared to those who have already had children, and in couples where the pregnant woman wants to give birth naturally compared to those where the pregnant woman wanted to give birth by caesarean section.

5. The need for support from a breastfeeding professional is higher among first-time mothers compared to those who have already given birth and feel that they will not need, or will not be applicable to call a breastfeeding professional.

6. Pregnant women who were not pregnant for the first time believe they will breastfeed for a longer period of time (over a year), compared to women who have been pregnant before and anticipate breastfeeding less overall.

7. Pregnant women who have been pregnant before expect not to be supported in breastfeeding by their partner/supporting person compared to first-time mothers who expect to be supported to a greater extent than those who have given birth before.

8. Pregnant women who have given birth before are more aware of the signs of postpartum depression compared to first-time mothers.

9. The most pregnant women, regardless of pregnancy parity, want to breastfeed and find a breastfeeding course useful.

10. The most mentioned situations, considered by pregnant women to be problematic, were: periods of illness of the baby, recovering from childbirth, caring for the newborn, breastfeeding, crying baby and diversification of feeding.

11. The majority of pregnant women recommend prenatal education courses (97.83%, 450 out of 460 pregnant women).

## **7. Study II: "The impact of prenatal education on women who have become mothers for the first time"**

### **7.1. Introduction**

The transition from pregnancy to motherhood is an important time in a woman's life, when she faces new responsibilities, emotional changes and specific needs. In the process, women who become mothers for the first time may experience different needs and perceptions than those who have other children (Katou Y. O., 2022).

**Work hypothesis:** There are significant differences between the perceptions, behavior and need for support of women who have become mothers for the first time and those who have given birth and are still having children.

**General objectives:** to identify and assess significant differences between the needs and perceptions of women who have become mothers for the first time and those who have given birth before, and the need for support from partners and family.

**Specific objectives:** to identify the specific needs of women who have become mothers for the first time and those who have given birth before; to investigate the impact of prenatal education on mothers.

### **7.2. Material and method**

The study group consisted of a sample of 230 women who became mothers and had children aged between 6 weeks and 14 months and who responded to the mothers' questionnaire between 25 June 2020 and 7 September 2021.

**Inclusion criteria:** age over 18 years; gave birth to a live foetus.

**Exclusion criteria:** patient's refusal to be included in the study; women under 18 years of age.

**Parameters analyzed: demographic, clinical and habitual indicators:** age, education: background, child's age, parity, mode of birth, weight, height; habits: diet,

smoking and **psycho-behavioral indicators**: participation in prenatal education courses and involvement of partner or carers in this regard; usefulness of prenatal courses in supporting breastfeeding of the newborn/breastfeeding infant and level of involvement of partners and family in the care of the newborn/breastfeeding infant; interest in prenatal education and usefulness of this type of education.

### **7.3. Results**

The following parameters were analyzed: age of women who gave birth naturally (mean rank 99.03) and age of women who gave birth by caesarean section (mean rank 121.06),  $U=4032.500$ ,  $Z= 2.191$ ,  $p=0,028$ ; BMI and background of respondent,  $\chi^2=11.090$ ,  $p=0,05$ , (0,220) ( $p=0,05$ ); incidence of smoking among mothers and age of child  $\chi^2=14.200$ ,  $p=0,007$ , (0,248) weak link ( $p=0,007$ ); prenatal education course attendance and background,  $\chi^2=9.705$ ,  $p=0,008$ , (0,205) weak link ( $p=0,008$ ); course attendance and first-time mother,  $\chi^2=12,721$ ,  $p\leq 0,001$  (0,237) weak link ( $p\leq 0,001$ ); educational attainment and course attendance,  $\chi^2=26,788$ ,  $p\leq 0,001$ , (0,344), moderate link ( $p\leq 0,001$ ); breastfeeding and child age,  $\chi^2=35.664$ ,  $p\leq 0,001$ , (0, 396) (0,280), moderate relationship ( $p\leq 0,001$ ); infant feeding (exclusive breastfeeding/supplemental formula) and infant age,  $\chi^2=89,733$ ,  $p\leq 0,001$ , (0,693) (0,346), moderate to strong ( $p\leq 0,001$ ); exclusive breastfeeding and tobacco use,  $\chi^2=17,951$ ,  $p=0,001$ , (0,310), moderate association ( $p=0,001$ ); participation in prenatal education course and breastfeeding,  $\chi^2=9,783$ ,  $p=0,044$  (0,231), weak association ( $p=0,044$ ).

### **7.4. Discussions**

The largest group came from urban areas and only a small number of respondents from rural areas, which can be justified by the fact that the study was conducted in a maternity hospital in Bucharest. The majority of respondents had a high level of education (university or postgraduate studies). Given the demographic and educational structure of the women participating in the course (the majority had university or postgraduate degrees), there is a need to evaluate the directions of development of educational programmes to overcome these differences and achieve wider participation of patients from disadvantaged backgrounds.

Although in the first study it was noted that a significant proportion of pregnant women expressed a desire to give birth naturally, the majority of respondents in this group gave birth by caesarean section. This result can be explained by various reasons, such as medical complications (Sharma, 2018) or personal preferences (Faas-Fehervary, 2015) but does not show that prenatal education has an effect on the choice of mode of delivery (Citak Bilgin, 2020).

Women who had younger infants (under 6 months) are less likely to be smokers, while smokers are more common among those with babies older than 6 months. These results indicate that women who smoked during pregnancy, even if they quit at some point, resumed tobacco use less than 1 year after giving birth (Murakami, 2023). Abstaining from smoking in the first months of a child's life reveals that mothers are more or less aware of the negative impact that passive smoking can have on their bodies at a young age.

Women living in urban areas are more willing to attend a prenatal education course compared to women living in rural areas. One explanation for this can be linked to the relative accessibility of the courses to women's homes, but also to their socio-economic and educational level. Although the population of our unit is predominantly urban, prenatal classes were not offered exclusively to this segment and participation was free.

We noted that first-time mothers were significantly more interested in attending a pre- and post-natal education course compared to those who had other children. These results have been highlighted in other studies and indicate a trend towards greater concern and interest in prenatal and postnatal education among first-time mothers, which may be explained by the fact that they are less experienced and want to be as well informed as possible about pregnancy, birth and newborn care (Ricchi A, 2020 ).

Mothers' participation in the course is correlated with their level of education, so that women with post-secondary or higher education were more interested in a pre- and post-natal education course compared to those with secondary education. In this context, the results raise the question of the accessibility of educational programmes in relation to the educational level and level of understanding of the participants. It is necessary that these programmes are adapted and use educational terms and means that are accessible and understandable to patients with low levels of education.

The most popular topics of discussion at the prenatal education courses were as follows: caring for the newborn, breastfeeding/feeding the newborn, preparing for childbirth, nutrition and hygiene in pregnancy, caring for the mother during the delivery period. It was interesting to note that none of the respondents found the topic of vaccination useful or interesting.

Medical contraindications to breastfeeding are rare (Meek, 2022) most mothers in the study group did not have a medical contraindication to breastfeeding (96,52%), suggesting that the most women are (physiologically) able to breastfeed (Tomori C. , 2022). The results of the study have shown that mothers with children under 1 year breastfeed more than those with children over 1 year.

We have observed that infants' feeding patterns are differentiated according to their age, with exclusive breastfeeding and the provision of formula milk being characteristic of the youngest age group (up to 6 months), after which infants tend to receive more diversified food. These data confirm that the most mothers start breastfeeding in hospital, and shortly after birth already offer formula supplements while only partially breastfeeding (Zimmerman, 2022).

Participation in prenatal education course increased the rate of breastfeeding mothers (Karaahmet, 2022). Course participants were more likely to breastfeed exclusively, and mothers who did not attend the course were more likely to be unable to breastfeed than those who did. I have noticed that young mothers tend to breastfeed for a shorter period of time (until the newborn/baby is at most 8 weeks old), while mothers with between the ages of 20 and 40 tend to want to breastfeed for longer periods of time (more than a year) more frequently.

Mothers with a higher level of education are more likely to want to breastfeed for longer (over a year), while short breastfeeding periods (under 8 weeks) are more common among mothers with secondary education.

It has been observed that non-smoking mothers are more likely to breastfeed for a longer period than one year, while smoker postpartum women are more likely to breastfeed for shorter periods. This correlation may be due to the fact that women who wish to resume tobacco use deliberately reduce their lactation period, because it can make them uncomfortable or limit addiction.

The partners get involved in supporting mothers with newborn/baby care in large numbers, and their support, for newborn care, decreases as the infant grows, but mothers also felt more often, as the infant grew, that it was not appropriate to receive this help. The results show that partner involvement in newborn care is significantly higher if the partner attends a pre- and post-natal education course (Takase, 2022). Men who have not accompanied their partners to such a course provide rather only partial support in caring for the newborn.

We did not observe any statistically significant association between the parameter supporting person in the first 6-8 weeks after birth and other parameters (age, educational level, background, first child, mode of birth or participation in pre- and post-natal education course, etc.). However, we noticed that the most frequently mentioned people who provided support were mothers and mothers-in-law, (or both), but also other family members (sister, grandparents, husband, etc). This suggests that the infants were helped by family members



(especially the mother and mother-in-law), regardless of her characteristics. There were also mothers in the study group who said they did not need help (11,89%).

We did not observe any statistically significant association between the situations that mothers considered to be problematic and other parameters (age, background, educational level, mode of birth, mothers with their first child or who have other children, etc.), but the most common problematic situations after birth were: breastfeeding, recovery after birth, crying and periods of illness of the newborn/child, which confirms that these topics must be addressed in as much detail as possible in prenatal education courses (Lewis-Jones, 2023).

In the study we investigated the occurrence of signs of postpartum depression and observed that the percentage of those who were affected by postpartum depression in the study group (27,83%) is higher compared to the results obtained in other studies (14%) (Liu, 2022) and highlights the need to develop emotion management programmes, including screening programmes for postpartum depression (Çankaya, 2022).

We noted that mothers who did not receive support from their partner in caring for their newborn/baby were more likely to develop some form of postpartum depression. Similar results have been reported in other studies, showing that father involvement in newborn/baby care had direct effects on reducing mothers' postnatal stress. Prenatal education courses can be introduced as routine postpartum care (Abbaspoor, 2023) and maternal health policies should encourage father involvement in child care (Zhang, 2022).

The current study confirmed that attendance at prenatal education classes is recommended by the majority of women who have given birth, whether or not they have attended one. The most common reasons given for attending the course were receiving "*correct and complete*" information and "*usefulness*".

#### **7.5. Partial conclusions:**

1. Caesarean delivery is the most common mode of delivery in the population studied.
2. Urban mothers have a body weight closer to normal than rural mothers who tend to have a weight above the normal limit in the population group investigated.
3. Tobacco use is increasing as the child grows older and is resumed significantly after 6 months of age reflecting the need to more actively address counselling against this habit in prenatal education.
4. The increased willingness of urban women to participate in prenatal education courses compared to rural women brings to the fore the need to re-evaluate prenatal education means and strategies for this population segment.

5. Lack of experience and primary parity are important motivations for accessing prenatal education courses.

6. The lower interest of women with a lower level of education makes it necessary to identify prenatal educational resources that are accessible to them in terms of presentation and level of difficulty.

7. The benefits of prenatal education are also reflected in the level of partner involvement in the child's care. Men who have not accompanied their partners to prenatal courses provide rather only partial support in caring for the newborn.

8. The tendency for the partner's involvement in childcare to become less as the child grows older, although a paradox unsupported by real needs, is noted for the most respondents.

9. The support and involvement of other family members, such as mothers or mothers-in-law, is due to the cultural concepts of Romanian society.

10. The prenatal education gained from the courses is also reflected in the ability of women who attended the courses to manage childcare more effectively than those who did not.

11. The most common situations that created problems after birth were: breastfeeding, recovery after birth, crying and periods of illness of the newborn/baby.

12. Lack of partner's support in caring for the newborn/baby is also reflected in the more frequent occurrence of depressive symptoms in these mothers.

13. The benefits of education obtained in prenatal classes are recognized even by women who have not attended them and who, in retrospect, recommend their usefulness.

## **8. Study III: "Prenatal education and its impact on breastfeeding and the need for postpartum support"**

### **8.1. Introduction**

Maternal and family health are a particularly important issue in our society. The present study aims to improve knowledge about the need of future parents for prenatal education and its effects on their behavior.

**Working hypothesis.** Participation in pre- and post-natal education courses has a positive impact on newborn care and breastfeeding skills. Women who do not attend such courses may have a lower level of knowledge and understanding about pre- and post-natal care and different support needs.

**Main objectives:** to identify and assess differences in perceptions between pregnancy and postpartum; to identify educational needs and impact of prenatal education on newborn care behaviors and breastfeeding; to identify factors influencing participation in prenatal education programs.

**Specific objectives:** to assess the perceptions and level of information of pregnant women and mothers about newborn care, breastfeeding and postpartum depression; to analyze the impact of prenatal education on pregnant women/mothers; to identify factors that can lead to improvements in the prenatal education programme.

## **8.2. Material and method**

The third study included a group of 125 women who responded to the two questionnaires (for pregnant women and mothers after childbirth). Basically, the group of 125 women (who filled the two questionnaires) was drawn from the two samples: 460 pregnant women and 230 mothers.

**Inclusion criteria:** age over 18, responded to both questionnaires: Questionnaire I (for pregnant women) and Questionnaire II (for mothers).

**Exclusion criteria:** refusal to be included in the study; age under 18; refusal to fill both questionnaires.

### **Parameters analyzed:**

- **Demographic, clinical and usual indicators:** age, education: education completed, background, child's age, parity, mode of birth, weight, height; diet, smoking.

- **Psycho-behavioral indicators:** the general perception of pregnant women and mothers was tested regarding: intention to attend/participation in prenatal education classes and preference for mode of delivery/how they gave birth; usefulness of topics covered in classes; breastfeeding status, involvement of partner or other family members, knowledge of signs of postpartum depression, interest in prenatal education and participation in classes.

## **8.3. Results**

The following parameters were analyzed: pregnant woman's preference for mode of delivery and how she actually gave birth,  $\chi^2=13.233$ ,  $p \leq 0,001$ , (0,325) moderate relationship ( $p \leq 0,001$ ); BMI (after birth) and smoking during pregnancy,  $\chi^2=14.897$ ,  $p=0,011$ , (0,345) moderate relationship ( $p=0,011$ ); educational level and participation in prenatal education courses  $\chi^2=37.390$ ,  $p < 0,001$ , (0,547) link strong link ( $p < 0,001$ ); course participation and background, ( $\chi^2=12.858$ ,  $p \leq 0,001$ , (0,321) moderate link ( $p \leq 0,001$ ); participation in pre- and postnatal education courses and number of children  $\chi^2=14.559$ ,  $p \leq 0,001$ , (0,341) moderate link ( $p \leq 0,001$ ); participation in prenatal and breastfeeding education

courses  $\chi^2=23.077$ ,  $p\leq 0,001$ , (0,450) moderate relationship ( $p\leq 0,001$ ); family support for newborn/baby care in the first 6-8 weeks and participation in the course by the midwife,  $\chi^2=7.742$ ,  $p=0,021$ , (0,249) weak relationship ( $p=0,021$ ); anticipation of postpartum depression and its actual manifestation  $\chi^2=15.713$ ,  $p=0,003$ , (0,355) (0,251) weak to moderate relationship ( $p=0,003$ ).

#### **8.4. Discussions:**

The respondents' higher level of education as well as their urban background may constitute a bias in the assessment of prenatal educational needs. The explanation may be due to the predominantly urban population accessing our maternity services, but other factors limiting access to participation in the study such as low socioeconomic status, lower educational level, lack of interest and even fear of being stigmatized for responses deemed inappropriate or erroneous cannot be excluded.

The predominance of pregnant women in the third trimester among the respondents of the first questionnaire is natural because as the pregnancy progresses, anxiety about childbirth, postnatal care, breastfeeding, newborn care, etc., becomes more intense and motivates patients to be interested in issues related to these problems. Mothers who also answered Questionnaire 2 afterwards are psychologically more motivated to participate in a study started before birth.

Caesarean section was the most common mode of delivery (74,40%). We observed that women who wanted to give birth by caesarean section did so in the majority of cases, compared to those who wanted to give birth naturally and did so in a lower percentage.

We observed that women who did not smoke during pregnancy had an associated weight closer to normal after birth, whereas smokers were more likely to be overweight or underweight. The result of this statistical test only refers to the association of the two parameters (BMI and smoking during pregnancy), but does not indicate a causal relationship between them. It is erroneous to say that smoking in pregnancy does or does not cause weight problems after birth, but we can assume that the association between smoking and higher weight is due to a certain paternity regarding behavior and the ability to control addictions.

As in the results of Study II, there was a statistically significant association between educational level and participation in prenatal education. Although it seems to be a paradox (if we assume that women with a higher degree of education have more information about prenatal education), the lack of interest in courses could be explained not by having knowledge in the field, but precisely by the lack of awareness of the difficulties related to the pre- and post-natal period, the prioritization of other activities, the apprehension about

the possibility of not understanding some information, the orientation towards traditional models in which information and support in this field are more reliable if they come from family members (relatives) or friends with more experience.

The same correlations could also be drawn from the lower interest of rural patients in prenatal education courses. In addition, they may find it more difficult to access courses due to location, transport and limited financial availability. As suggested by other authors, it is necessary to include rural women in prenatal education programmes to help them understand aspects of prenatal care. (Mary G. Jenkins, 2014), (Guliani H, Sepehri A, Serieux J., 2012).

One of the directions that emerges from the study is dedicated to the promotion and expansion of prenatal education and must take into account precisely these limits of access, for women with fewer resources, with low or poor educational level, they constitute a disadvantaged and often ignorant section of the population.

The results of the study showed that a higher percentage of first-time mothers attended prenatal classes (90,10%) than those who had other children (9,9%). The increased interest of first-time mothers to participate in courses is legitimate, and the belief that previous experience is sufficient for them, as well as less time or financial resources in mothers who already have other children, is a reason for them to be less interested in participating.

We investigated the usefulness thereof and interest in the topics covered in the course and found that the most popular topics were: newborn care, breastfeeding/feeding the newborn, preparation for birth, nutrition and hygiene in pregnancy. Surprisingly, although it is often a new situation and sometimes seriously challenging, respondents were not interested in midwifery care.

It has been shown that breastfeeding requires both practical knowledge and skill acquisition (Aji, 2019), with breastfeeding being considered by mothers to be one of the most interesting topics in prenatal education courses. The results of the study showed that there was a statistically significant association between participation in prenatal education and breastfeeding,  $\chi^2=23,077$ ,  $p\leq 0,001$ , (0,450). These results are consistent with the literature showing that information on methods, benefits, measures to overcome difficulties in natural infant feeding resulted in increased adherence to this mode of infant feeding (Kehinde J, O'Donnell C, Grealish A., 2023).

Although the degree of partners' involvement in newborn care differed between participants and non-participants in prenatal education courses, the data indicated that partners provided support in caring for newborns. It is possible that the partners who accompany women to prenatal education courses are more aware of the responsibility and

effort of bringing a child into the couple's life. The images and practical activities provided during the classes can also increase confidence in their ability to perform various gestures, as well as create stronger psychological and emotional bonds with the newborn (bonding).

Although, as discussed in Study II, the involvement of family members (mothers, mothers-in-law, etc.) in supporting pregnant women is a constant in Romanian society, which is more related to the customs and culture of the nation, participation in prenatal education courses has given women more security, information and independence in assuming the role of mother.

The incidence of postpartum depression is higher among women who anticipate being affected by it. The manifestation of depressive symptoms, particularly in women who anticipate having the condition, is a controversial issue, the causes of which may be multiple. On the one hand, they may have had a number of symptoms or a depressive background prior to birth, which, as well as studies in the literature (Wu D. J., 2022), a predisposing factor. On the other hand, we can assume that these women, being better informed and more aware of how depression and anxiety manifest themselves, were able to identify them more easily.

Another objective of the study was to identify educational needs and issues of concern to women both pre- and post-giving birth. Our study shows that the hierarchy of these concerns is different in the two periods. Thus, before giving birth, pregnant women considered a number of issues (such as sleeping with the baby, caring for the newborn, fatigue, adjusting to life with a baby) to be problematic. After giving birth, the most serious problems they faced were related to breastfeeding, recovering from childbirth and crying.

### **8.5.Partial conclusions**

1. The younger age of first-time mothers makes it necessary to target this group as an important section to be addressed in prenatal education.
2. A phenomenon with multiple and often unpredictable causes is the change in the mode of delivery options of pregnant women, often the intention to give birth naturally is replaced by caesarean section.
3. Women who did not smoke during pregnancy have a normal weight after giving birth. The statistical result only refers to the association of the two parameters (BMI and smoking during pregnancy), but does not indicate a causal relationship between them.
4. The prenatal education course is more accessed by urban and more highly educated women than rural women with primary or secondary education.

5. Interest in prenatal education courses is higher among women who are having their first child compared to those who are already having children.
6. The most popular topics discussed at prenatal classes are: caring for and breastfeeding the newborn, preparing for birth, nutrition and hygiene in pregnancy.
7. The partners provide support in caring for newborns regardless of whether or not mothers have attended the prenatal education course.
8. The course is appreciated for the novelty of information found and the practical examples.
9. Women who have not attended prenatal education classes breastfeed less often or not at all compared to mothers who attend classes, although majority of respondents both before and after giving birth wanted to breastfeed for a longer period of time (between 6 months and one year or more than one year).
10. Women who have attended prenatal education classes are less likely to need support in caring for their newborn compared to those who have not.
11. Postpartum depression occurs significantly more frequently in women who expected to be affected during pregnancy.
12. Before giving birth, pregnant women consider that the baby's sleep, tiredness, adaptation to life with the baby, but also the baby's adaptation to the living environment, lack of help from the partner, mental state/anxiety, accumulated kilos are the most common situations that will create problems for them. After birth, however, most of them experienced problems with breastfeeding, recovering from childbirth or crying.
13. The vast majority of pregnant women believe that they will be supported after giving birth, but actually, fewer receive support.
14. The vast majority of pregnant women want to breastfeed, but fewer do.

## **9. Conclusions and personal contributions**

### **9.1. Conclusions and recommendations**

The study demonstrated interesting results, despite several limitations that will be discussed below. The restrictions imposed by the COVID-19 pandemic and the transformation of Bucur Maternity Hospital into a support unit for Covid patients made it impossible to follow up all the participants included in the study, making it difficult to communicate with them to complete the second phase of the study. Another methodological limitation was that data collection was achieved exclusively online without direct

communication with the respondents, which induces some subjectivity in the evaluations. However, this study provides valuable information about how pregnant women and mothers perceive prenatal education and their behavior regarding the need for newborn care and breastfeeding.

In response to the main objective of the PhD thesis, the study identified a variety of personal characteristics of pregnant women and mothers, including age, education level, background, smoking, diet and previous experience of pregnancy or childcare. The results of the study showed that these characteristics influenced their level of interest in prenatal education, but also their need for partner and family support in caring for and breastfeeding their newborn.

A comparative analysis of the three studies showed that the majority of participants in the prenatal education courses showed a significant interest in this type of courses. This indicates the desire of pregnant women and mothers to gain additional information and knowledge about pregnancy, childbirth, breastfeeding and childcare.

The study found that participation in prenatal education classes has a positive impact on newborn care and breastfeeding skills. Pregnant women and mothers who participated in these courses showed greater confidence in their own childcare skills and demonstrated higher levels of knowledge and a higher rate of exclusive breastfeeding.

The research highlighted the essential role of prenatal education in preparing pregnant women and mothers, facilitating the acquisition of knowledge and skills related to newborn care and breastfeeding.

We have thus identified that in Romania there is an acute need for the development of this type of service, by including it in the "National Health Programmes" and financing it by the competent institutions ("Ministry of Health", "CNAS"). Organising courses in different geographical areas (rural or urban) or within medical establishments (hospitals, maternity wards, etc.) can facilitate access to them. Promotion of the courses by medical institutions and medical staff can lead to increased attendance. There is also a need to establish course models and standardize prenatal education programmes according to the personal and habitual needs and characteristics of pregnant women. All of this can lead to collaborations between health care providers and even to the development of specialization programmes for health care staff involved in training parents-to-be.

The development and implementation of these strategies can encourage and support the participation of parents-to-be in prenatal education courses, contributing to better



information and preparation for a healthy pregnancy and birth, as well as increasing the number of exclusively breastfed babies.

Following the results of the study we make some **recommendations with direct practical applicability**:

1. Designing customized educational programmes and information methods that are tailored to the educational needs and level of understanding of the participants.

2. Targeting in the delivery of these programmes people who belong to disadvantaged groups (rural environment, low socio-economic level, low level of schooling, etc.) as they are the ones most in need of information and support.

3. Including in the programmes certain issues such as discrimination, gender-based violence, combating family and child abandonment and working with institutions that can provide support in these cases.

4. Identifying issues that are less well known and addressed in prenatal education, but which have a major impact on the health of the mother and newborn, and on the family climate (depression, care in labour, eating habits and addictions including alcohol and tobacco).

5. Including information on family planning methods and information on the impact that unwanted or risky pregnancies can have on women in educational programmes.

## **9.2. Personal contribution**

The personal contribution of the PhD thesis entitled “The impact of pre- and postnatal education on the health of pregnant women” is based on 3 prospective studies that analyze the particularities of pregnant women and mothers, various aspects of prenatal education and the correlations between them.

We can consider that the originality of our study lies in the fact that so far, no similar research has been conducted in Romania and many aspects of the study have not been highlighted in the literature. Thus, both general and specific objectives have been achieved.

Although postpartum education is considered a priority, there are not enough studies investigating its effectiveness in detail. We also believe that our research is a starting point for further studies investigating: the quality of information provided in prenatal education classes, the use of modern technologies versus traditional methods of prenatal education, the prenatal education and counseling needs of partners, and the effects of these types of classes on the health status of the mother, the baby and the whole family.

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## PREVIOUSLY PUBLISHED WORKS

**1. Balasoiu AM**, Olaru OG, Sima RM, Ples L. „How Did Prenatal Education Impact Women’s Perception of Pregnancy and Postnatal Life in a Romanian Population’’. *Medicina*. 2021; 57(6):581. (ISI) Impact factor 2.948 (2021); 5-Year Impact Factor: 2.985 (2021)

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**2. Anca Maria BALASOIU**, Cristina-Diana POMANA, b, Romina-Marina SIMA, Liana PLES, The Influence of Educational, Environmental and Social Factors in the Decision to Attend Prenatal Lectures among Pregnant Women in Romania; *MAEDICA – A Journal of Clinical Medicine*, 2021, Dec; Volume 16, No. 4, 16(4): pp 574–579; (BDI)

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**3. Anca Maria Balasoiu** , Mihai-Daniel Dinu , Gabriel-Petre Gorecki , Romina-Marina Sima , Liana Ples, „The Impact of Prenatal Lectures in Breastfeeding and Neonatal Care in Romania - Our Experience’’; *MAEDICA – A Journal of Clinical Medicine*, 2022, June; Volume 17, No. 2, 291-296, (BDI)

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