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**FACULTY OF PUBLIC HEALTH**  
**DEPARTMENT OF HEALTH CARE**

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**ELECTRONIC SYSTEM**  
**FOR MIDWIFERY CARE MANAGEMENT**  
**IN OUTPATIENT CARE**

**ABSTRACT**

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Health care management

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The defense materials are available in the "Doctoral School" department of MU-Varna and are published on the website of MU-Varna.

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## **ABBREVIATIONS USED**

|                    |  |
|--------------------|--|
| <b>ABM</b>         | <b>Academy of Breastfeeding Medicine</b>   |
| <b>AL</b>          | ambulatory list  |
| <b>BAHP</b>        | Bulgarian Association of Healthcare Professionals  |
| <b>DMS</b>         | Database management system   |
| <b>EOR</b>         | electronic obstetric record  |
| <b>EQ</b>          | Educational qualification  |
| <b>HCP</b>         | health care professionals  |
| <b>HIP</b>         | Health insured person  |
| <b>IDC</b>         | International disease classification   |
| <b>IPS</b>         | International patient record   |
| <b>LAMNMHPDTPA</b> | Law on Associations of Medical<br>of nurses, midwives and allied health professionals, of dental<br>technicians and of pharmaceutical assistants |
| <b>MANA</b>        | Midwives Alliance of North America   |
| <b>MC</b>          | Medical centre   |
| <b>MEAC</b>        | Midwifery Education Accreditation Council  |
| <b>NACPM</b>       | National Association of Certified Professional Midwives  |
| <b>NANDA</b>       | North American Diagnostic Nurses Association   |
| <b>NARM</b>        | North American Registry of Midwives  |
| <b>ND</b>          | Nursing diagnosis  |
| <b>NFA</b>         | National framework agreement   |
| <b>NHIF</b>        | national health insurance fund   |
| <b>NHIS</b>        | national health information system   |
| <b>NI</b>          | Nursing interventions  |
| <b>NP</b>          | Nursing process  |
| <b>NRA</b>         | National Revenue Agency  |
| <b>NSI</b>         | National Statistical Institute   |
| <b>PC</b>          | pregnancy counselling  |
| <b>PD</b>          | Personal doctor  |
| <b>PIC</b>         | Personal identification code   |
| <b>PIN</b>         | Personal identification number   |
| <b>RHI</b>         | Regional Health Inspectorate   |
| <b>UID</b>         | Unique ID number   |

**WHO**

World Health Organization

## I. INTRODUCTION

Midwifery is seen as the fourth pillar of modern medicine. It encompasses the care of a woman at every stage of her life and seeks to respond to her specific needs. The midwife is the health professional who traditionally provides care and advice on issues related to pregnancy, childbirth, breastfeeding, child development, contraception and family planning.

According to a number of studies, her role has changed and evolved over the centuries, from an autonomous but not-well-educated one in the Middle Ages, to a highly educated professional fully subordinate to the physician. Today, the changes continue - in addition to being a confidant and a valuable source of information, the midwife is now a health care professional who can open and run an independent practice.

Global trends are towards digitalization of medical services. We are witnessing the ever-increasing presence of computer technology in the diagnostic and treatment process. Electronic records have become common practice in developed countries. They have proved their practicality and have enabled computer algorithms to suggest possible problems and provide alternative solutions to specific cases. They allow the building of multidisciplinary teams, reduce the risk of errors and ensure continuity of care.

Electronic nursing records have elevated the need for flexible, adaptable, highly educated health care professionals to new heights. The public has begun to see the specifics of nursing care plans and appreciate the comprehensive role nurses play in care planning and implementation.

Bulgaria has also followed the trend of digitalization of medical records. Specific medical software is used in outpatient and inpatient care. A National Health Information System is up and running. The volume of data required to be entered is expanding. New components are being developed and information from different contractors is being merged.

The relevance of the topic of this dissertation is determined by the need for accountability and written recording of activities performed by the health care professional. In outpatient care settings, there are a wide range of activities that midwives can perform independently or under the direction of a physician. There is no documentation to record this.

Analysis of the available literature shows the diverse functions and responsibilities of the midwife. Changes in the regulations governing professional practice have made it possible for health care professionals to conduct home visits within 6 months of a child's birth. This initiative cannot fulfil its capacity, in terms of improving the health of the mother and the newborn child, as there is a lack of continuity of care between the midwives of the Women's Consultation and the nurses in outpatient care. The management of midwifery care in outpatient care will contribute to improving the quality of health services provided, and will create conditions for working in a multidisciplinary team.

The significance of the problem, the challenges in contemporary obstetric practice and the possibilities of introducing an electronic obstetric record arouse our research interest and are the basis for the development of this thesis.

## **II. AIM, OBJECTIVES, MATERIAL AND METHODOLOGY OF THE STUDY**

### **2.1. Aim, objectives and working hypotheses**

**Aim:** To investigate and optimise the management of obstetric care by developing a methodology for integrating an electronic obstetric record in outpatient care.

To achieve the main objective, the following **tasks** are set:

1. To study the development of obstetric care for the pregnant woman, the parturient and the newborn child.
2. To study the Bulgarian and foreign experience in the application of specific nursing/midwifery documentation in independent obstetric care.
3. To identify best practices for nursing/midwifery care planning.
4. To explore the views of experts, health care educators and midwives on the need to introduce an electronic midwifery care record.
5. To undertake a theoretical analysis of the documentation associated with recording independent midwifery activities and care.
6. To establish the feasibility of integrating an electronic midwifery record into current medical software.
7. To develop and propose a methodology for the establishment of an electronic management system for obstetric care in outpatient settings.

### **Working hypotheses**

Based on the literature reviewed and the stated aim of the dissertation research, the following working hypotheses were formulated:

1. The development and implementation of specific documentation to record midwifery activities and care in outpatient care is essential for practice, whereby we hypothesise that the majority of medical professionals surveyed will express a positive attitude towards the introduction of an electronic midwifery record.
2. Interaction between medical professionals in the midwifery care team is poor and feedback is lacking.
3. The feasibility of an electronic obstetric record in outpatient care is hampered due to lack of statutory documentation.



4. We assume that the midwifery record based on the nursing process implementation model enables systematization and continuity of care, the deployment of the full midwifery potential of knowledge and skills, and the control and accountability of professional activities.

We developed the hypotheses taking into account the development of midwifery practice and the need to create specific documentation in the context of the national plan for digitalization in healthcare.

## **2.2 Material and methodology**

### **2.2.1. Subject of the study**

The subject of this study is specific midwifery documentation in planning, organizing and conducting activities in midwifery practice.

Depending on the research subject, the dissertation includes two main components of research: theoretical study and empirical study.

### **2.2.2 Objects of the research**

- Normative documents regulating the professional activities of the midwife;
- Literature/electronic sources on good practice in the organisation and delivery of nursing and midwifery activities and care;
- Practical activities of the midwife in providing self-care;
- Database management systems;
- Midwives working in outpatient settings in midwifery care;
- Health care educators from higher education institutions across the country who are involved in teaching the theoretical and practical foundations of nursing and midwifery care;
- Experts from the structures of the Bulgarian Health Care Association, with competence and specialized knowledge in the field of midwifery activities and care.

### **2.2.3. Survey design**

The research design includes theoretical and empirical research.

#### **I. Theoretical study**

- 1. Study of the organization of obstetric practices in the follow-up of pregnancy, the condition of the mother and the care of the newborn child.*

A traditional method was applied to analyse the content and nature of independent activities of the midwife in outpatient care. It sought to answer the following questions: what is midwifery practice (type and form); what are the goals of practice; what is the reliability of the model of care; what is the societal impact; what conclusions can be drawn about the current study.

### ***1. Study the available specific obstetric documentation used by health professionals in planning and providing care.***

A content analysis (quantitative analysis) of documentation derived from the International Patient Summary concept, existing practice internationally and documents developed for midwifery practice in our country was applied.

The purpose of the theoretical analysis is to reveal the structure and identify best practices in the implementation of specific nursing/midwifery documentation, as well as their future plans when performing independent midwifery care.

The attached analysis includes:

- documents of historical nature, related to the development and establishment of the midwifery profession in the world and in Bulgaria;
- normative documents ratifying the independent competences of midwives;
- Literature, agreements and consensuses on the application of the nursing process and nursing diagnosis;
- currently applicable national and international legislation concerning midwifery practice;
- European and Bulgarian guidelines concerning the digitisation of health services and the related documentation.

### ***2. Study of database management systems.***

An applied method for determining data structures. We use the analysis of database management systems to establish the type of data organization and the relationships between them. The aim is to establish the capabilities to create, process and maintain the information needed for obstetric care planning. The method involves exploring different functions that enable database management, classified into four main functional groups: data definition, modification, retrieval and administration.

## **II. Empirical study.**

*1. A qualitative survey of midwifery-qualified health professionals and experts in midwifery activities and care regarding the management of midwifery care in outpatient care.*

The method applied to collect information was an in-depth interview. It reflects the views of health care professionals and proven experts in the field of midwifery practice. We used the in-depth interview to explore attitudes towards the creation of an electronic midwifery record. The aim is to validate further research on professional competencies for implementing the nursing process and planning midwifery care in outpatient settings.

Information recruitment was formed through casual conversation, in a natural environment for the participants - their workplace. Conditions were created for maximum freedom and spontaneous sharing of professional experiences, opinions and personal impressions.

Participants in the present study were 40, selected on a voluntary basis, with pre-formed criteria aimed at inclusiveness, i.e. participation of people from all levels associated with the provision of obstetric care in outpatient settings. The study included 30 respondents from outpatient care facilities where assessment and care of pregnant women, parturients and newborn children is provided from the cities of Varna, Veliko Tarnovo and Shumen. The respondents were selected because of their experience in carrying out the activities and care under the Maternal Health Programme. Among the participants in the in-depth interview are 10 experts, proven professionals in the field of obstetric care and researchers in the field of modern nursing from the cities of Sofia, Varna, Pleven, Ruse and Veliko Tarnovo. The experts have been selected because of their experience in drafting normative documents and the managerial administrative position they hold in the organizational structure of the Bulgarian Association of Health Care Professionals.

For the purpose of the study, **Questionnaire No. 1 and Questionnaire No. 2 were developed to conduct an in-depth interview.** Two main research questions were formulated, focused on the subject of the study - specific midwifery documentation in planning, organizing and conducting activities in midwifery practice. Subsequent sub-questions address the challenges of implementing an electronic obstetric record, its components and its implementation as medical software.

**2. *A quantitative survey among faculty members in the field of health care regarding the competencies for applying the nursing process and working with electronic-based information in the learning process.***

Knowledge of the application of the nursing process was assessed through the views of faculty involved in teaching the Philosophy and Introduction to Nursing and Midwifery courses. Theoretical foundations" and "Practical foundations of nursing and midwifery care in pregnant, parturient and gynaecologically ill women".

The quantitative methods include conducting a questionnaire survey, among academic lecturers of the Medical University "Prof. D-r Paraskev Stoyanov - Varna, Medical Universities in Pleven and Plovdiv, Ruse University "Angel Kanchev" - Ruse and Thracian University - Stara Zagora.

For the needs of the quantitative study, an interview questionnaire was developed, which included 15 questions divided into the following groups: group one - concept of an electronic midwifery record based on a nursing care plan; group two - explore the components of an electronic midwifery record and its application in practice; group three - explore the effectiveness of an electronic midwifery record in relation to midwives' activities.

***Inclusion criteria:***

- medical specialists with professional qualification "Midwife", working in an obstetric-gynaecological office and/or in an independent/group obstetric practice;
- medical specialists with a professional qualification "Midwife" with a contractual relationship with an outpatient care facility;
- medical specialists with a professional qualification "Midwife" working with a doctor following up pregnant women under the Maternal Health Programme.
- Academic teachers of health care involved in the theoretical and/or practical training of students studying the speciality of midwife;
- Experts involved in the management structures of the Bulgarian Association of Health Care (the Board of Directors at national and regional level, the regional college of the BAHP, the National Professional Advisory Council);

- experts with competence and specialised knowledge in the field of midwifery activities and care. who gave informed consent to participate in the study.

***Exclusion criteria:***

- medical specialists with a professional qualification "Midwife" who do not have a contractual relationship with an outpatient care facility;
- medical specialists with a professional qualification "Midwife" who work in an outpatient care facility which does not have an obstetric-gynaecological office;
- disagreement by the facility to be included in the study;
- Academic lecturers who are not directly involved in the training of midwifery students;
- Experts, from the structures of the BAHP, who have an expired mandate for a leadership position;
- Experts, from the structures of the BAHP, permanently unable to fulfil the mandated functions;
- refusal to be included in the study.

***Logical units of inquiry:***

- first logical unit - any midwife practicing in an outpatient facility where obstetric care is provided;
- second logical unit - academic teachers of students studying midwifery;
- third logical unit - experts, proven innovators in the field of nursing, directly involved in the drafting of model documents related to professional midwifery.

**Study area.** BAHP - Headquarters, Sofia; Regional College in Varna; Regional College in Veliko Tarnovo; Medical University "Prof. Dr. Paraskev Stoyanov", Varna; Branch of the Medical University - Shumen; Branch of Medical University - Veliko Tarnovo; Medical University in Plovdiv; Medical University Pleven; University "Angel Kanchev" - Ruse; Thracian University in Stara Zagora; Branch Thracian University - Stara Zagora in the town of. Haskovo; Hospital St. Marina" - Varna; Medical centre "Chaika" – Varna; Medical centre

"Prof. Dr. Dimitar Stamatov - Varna"; Ajibaden City Clinic - Medical Centre - Varna; Medical centre Clinica Nova; Medical centre Veliko Tarnovo; Medical centre Shumen.

#### **2.2.4. Survey organisation**

The study was conducted after approval by the Research Ethics Committee of the Medical University of Varna with Protocol No. 121 dated 06.10.2022. In order to achieve greater accuracy, the main part of the study was carried out independently by the PhD student. Collaboration of health care managers (chief nurses) of outpatient care facilities in the country was used. The selected collaborators, were briefed in advance about the purpose, methodology for conducting the study and trained in the use of the instruments (data protection notice for the subjects, information for the respondents, informed consent form for participation, survey instrument).

The survey activities include 5 phases, with the respective instrument and period of implementation defined.

### **2.3. Survey methods**

#### **2.3.1. Sociological methods**

- A **documentary method** to elucidate the nature of the midwives' role as the lead health professional in monitoring normal pregnancy, the evolution of the nursing process and innovations regarding documentation of care;
- An **in-depth interview** to explore the conditions and challenges of managing midwifery care in outpatient settings;
- A **standardized interview** to explore the views of academic faculty regarding the conditions for the implementation of an electronic midwifery record;
- **SWOT analysis** method to analyse the strengths and weaknesses of the electronic obstetric record, and the opportunities and threats for its integration into practice;
- The **relational model** for selecting a database management system pertaining to their management - creation, processing and maintenance. Data are organized into tables between which relations are made.

### 2.3.2. Statistical methods

- **Statistical grouping of data** - identification of the subject of statistical study in each study was used as the basis on which the methodology for creating the electronic obstetric record was developed. Information on individual statistical units (respondents) such as length of work experience was taken into account. Statistical grouping of the obtained data was also done.
- **Descriptive (descriptive) methods** having a direct relationship with the distribution of statistical units according to the meanings of their attributes, revealing their nature and internal structure. Graphical representation of the empirical distribution is an essential part of descriptive statistical methodology. In this study, the following graphical representations are applied: column type charts, comparative column type charts and pie charts. After statistical processing, some of the data are summarized in tables.
- **Frequency analysis** of qualitative variables to calculate absolute and relative frequencies, with characterization of the distribution of categorical variables;
- **Correlation analysis** to establish dependencies between the populations studied. The main measure of the closeness of dependence is the correlation coefficient  $r$ . Comparison of the perceived benchmark level of significance and the calculated cut-off level of significance (Significance) is applied as a method in this study in verifying the statistical significance of the obtained correlation coefficient  $r$ . Non-parametric contingency correlation coefficient was used, which is applicable when examining relationships with variables located on a nominal scale.
- **Comparative analysis** using bivariate distribution.
- **Multiple response technique** used in conjunction with measuring and evaluating the opinions expressed by respondents about the components that should make up the electronic obstetric record and the members of the medical team who should have access to the information stored in it.

## 2.3. Conceptual apparatus

Due to the variety of concepts that are often used as contextual synonyms but differ in content, we find it necessary to present the conceptual apparatus used.

- **outpatient care facilities** - outpatient clinics for primary medical care /individual or group practices/, outpatient clinics for specialised medical care /individual or group practices/, medical centres or diagnostic-consultative centres where doctors carry out diagnosis and treatment of diseases, pregnancy monitoring, health promotion and prevention activities;
- **autonomous midwifery practices** - autonomous practice organised and managed by midwives who carry out care and manipulation within the professional activities defined for them in Regulation 1 of 08.02.2011, which they may carry out by appointment or independently, subject to strict operating regulations;
- **counselling** - the accumulation of knowledge and information on a given subject.
- **consultation** - an opinion given by a specialist in a given field;
- **antenatal consultation** - the monitoring of a woman's pregnancy from the time of registration until admission to a maternity hospital, and during the first 45 days after delivery, by relatively simple, non-invasive, highly informative methods and means. Follow-up consists of a series of examinations, somatic and laboratory tests that are not evenly distributed throughout the pregnancy, but vary in frequency depending on the progress of the pregnancy and the condition of the expectant mother
- **antenatal care** - prophylactic, diagnostic and therapeutic care for the pregnant woman in order to preserve the health of the mother, prevent complications and ensure the birth of a healthy and viable foetus and healthy offspring. Modern antenatal care should begin even before a woman becomes pregnant;
- **perinatal care** - intensive obstetric care in the period around birth (immediately before, during and after birth) to prepare and educate the pregnant woman for childbirth and newborn care, breastfeeding support and recovery after birth, regardless of the mode of delivery;
- **prevention** - a set of measures and interventions to prevent the occurrence, development and spread in humans;

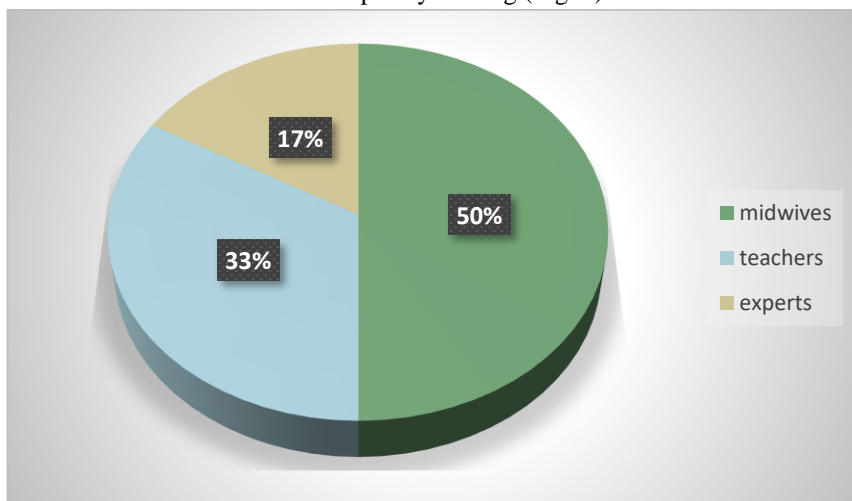


- **nursing process** - a systematic scientific approach to planning and providing active nursing care;
- **nursing diagnosis** - the formulation of a clinical judgement by a midwife about responses to manifest and potential health problems, to the process of life of an individual, family or collective;
- **record** - a set of documents and materials relating to a particular person;
- **software** - a collection of all information from instructions, grouped into algorithms, grouped as programs with different purposes and their required data;
- **digitisation** - the process of converting information from analogue media into digital form using electronic devices so that the information can be processed, stored and transmitted in a digital environment via computer networks, satellite, internet to the user, regardless of his location.

### III. RESULTS AND DISCUSSION

#### 1.1 Characteristics of the subjects

In the research, the opinion of 60 respondents was studied, distributed as follows: medical professionals with a professional qualification "Midwife", practicing in outpatient care facilities (n=30), academic lecturers involved in the teaching of the disciplines "Philosophy and introduction to nursing and midwifery care. Theoretical Foundations" and "Practical Foundations of Nursing and Midwifery Care for Pregnant, Parturient and Gynaecologically Ill Women" (n=20), and experts (n=10), established professionals in midwifery care and researchers in the field of contemporary nursing (Fig. 1).



*Figure 1. Distribution of respondents in the empirical survey*

At present, there are no statistics on the number of midwives practicing in outpatient care. Due to the specificity of adding a specialty to an already registered medical facility and concluding a contract and/or annex with the NHIF, the exact number of medical facilities where obstetric-gynaecological services are provided cannot be indicated at this stage. The data on the number of midwives in operation, according to the registers of the BAHP and the National Statistical Institute as of 31.12.2022, as well as reports on the number

of outpatient medical care facilities /IMH/ from the register of Regional Health Inspectorates are presented in Table 1.

**Table 1. Distribution of medical professionals with professional qualification "Midwife" and outpatient care facilities**

| District       | Total number of midwives | Number of outpatient care facilities |
|----------------|--------------------------|--------------------------------------|
| Varna          | 369                      | 80                                   |
| Veliko Tarnovo | 38                       | 28                                   |
| Shumen         | 59                       | 12                                   |

Midwives working in outpatient care facilities included in the study were 30. Of these, 56.67% (n=17) practiced in Varna, 23.3% (n=7) in Veliko Tarnovo, and the remaining 16.6% (n=5) in Shumen. Good practice requires obstetrics and gynaecology specialists to work in a team with midwives. The lack of standards has led to the common practice of doctors working alone. For these reasons, although there is a significant difference between the number of health facilities in Varna and other cities, there is a relatively even distribution of midwives. The crosstabulations between the variables "district city" and "type of health facility" are presented in Table 2.

**Table 2. Bivariate empirical distribution between district city and type of health facility**

| District       | Medical institution |                                    | Total |
|----------------|---------------------|------------------------------------|-------|
|                | Medical Center      | Diagnostic and Consultative Centre |       |
| Varna          | 22                  | 7                                  | 29    |
| Veliko Tarnovo | 6                   | 2                                  | 8     |
| Shumen         | 2                   | 1                                  | 3     |

The estimated coefficient of contingency of 0.734 indicates the presence of a significant linear relationship between the two variables "district city" and "type of health facility". The coefficient can be accepted as statistically reliable

(Sig  $p=0.000 < \alpha=0.05$ ), given that the calculated Significance cut-off level is less than the accepted risk of error of 5%.

The study included midwives working in facilities with significant involvement in the provision of obstetric care in outpatient settings. We assume that these professionals, have the most accurate judgement of nursing and midwifery activities and could give a meaningful opinion, on the management of midwifery care in outpatient care.

Lecturers who confirmed participation in the in-depth interview made up 51% ( $n=20$ ) of all lecturers in the universities where the study was conducted, giving a representative sample. A significant proportion of the academic lecturers had proven experience and qualifications in teaching students in midwifery.

The experts participating in the study were from different structures of BAHF from the cities of Sofia ( $n=3$ ), Varna ( $n=3$ ), Pleven ( $n=1$ ), Ruse ( $n=1$ ), Veliko Tarnovo ( $n=2$ ). Their number in the respective structure is determined on a quota basis.

The average age of the respondents was 43.9 years ( $n=60$ ). The age distribution shows the highest share of participants between 40-50 years. The age range of the interviewed health care professionals fits in the range 22 - 65 years. Teachers who participated in the study were between 28 - 57 years of age. The age of the experts we interviewed fell between 37 - 58 years. There were no statistically significant differences in the mean ages of the participants ( $p > 0.05$ ). This gives us reason to believe that the answers given are based on long experience and are a kind of foundation on which to build a software product distinguished by practicality and intuitiveness (Table 3).

**Table 3. Descriptive statistics**

| <b>Age</b>      | <b>N</b> | <b>Min</b> | <b>Max</b> | <b>Mean</b> | <b>Std. Deviation</b> |
|-----------------|----------|------------|------------|-------------|-----------------------|
| <b>Midwives</b> | 30       | 22         | 65         | 43.5        | $\pm 4.763$           |
| <b>Teachers</b> | 20       | 28         | 57         | 43.0        | $\pm 4.754$           |
| <b>Experts</b>  | 10       | 37         | 58         | 45.5        | $\pm 4.673$           |

|                             |   |    |   |   |   |   |
|-----------------------------|---|----|---|---|---|---|
| <b>Valid<br/>(listwise)</b> | N | 60 | - | - | - | - |
|-----------------------------|---|----|---|---|---|---|

The views of representatives from the education-practice-expertise triad can be reported with a high degree of confidence and generalised conclusions can be drawn about the design of the electronic midwifery record methodology.

### **1.1. Attitudes towards the introduction of an electronic obstetric record**

In recent years, Bulgaria has seen a trend towards the implementation of policies to modernise healthcare. Some of them are aimed at digitalization of health services, in particular their administration. At this stage, all officially recognised documents - outpatient lists, medical referrals, referrals for hospital admissions and so on - concern only doctors. There is still no unified medical documentation concerning the activities of healthcare professionals.

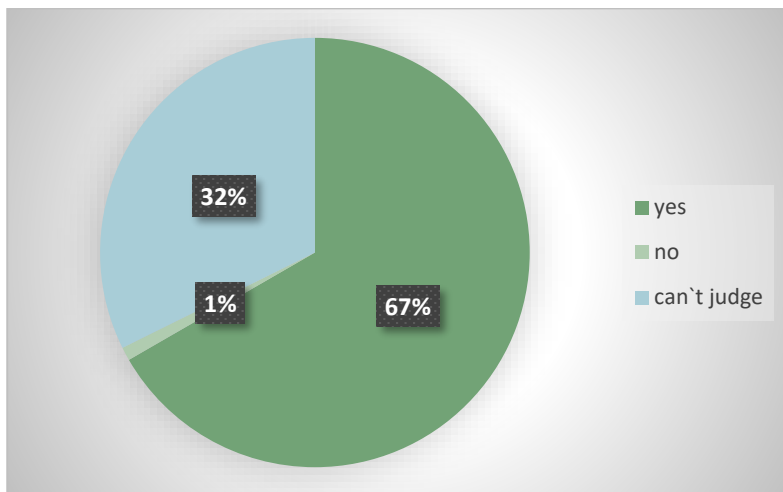
A number of authors stress the need for specific documents and attempt to create them. The BAHP, as a professional organisation, creates a set of documents intended to be used within independent practices. These are not yet subject to the attention of the NHIF /the direct source of funding for health services/, nor are they recognised by voluntary health insurance funds. Driven by our desire to build on the existing templates, we have added to and transformed them into a software product.

In order to be sure that the electronic midwifery record would be applicable in practice and would be of service to users (doctors, health care professionals, patients and administrators) we consulted midwives practicing in outpatient care, university professors and experts from BAHP structures.

Improving the quality of health care delivery is a strategic goal of health systems, an aspiration of educational institutions, and an ideal underlying nursing. From a health care perspective, we accept Nikolova's view, which defines it as a combination of efficiency, safety, putting the patient at the centre of care, access, relevance and continuity of care. The ER-based nursing care plan meets these criteria. We therefore asked our participants whether the introduction of EOR would contribute to improving the quality of midwifery care provided. We found statistical significance, repeatability and a characteristic pattern among the responses.

The majority of respondents expressed a positive attitude towards the introduction of an electronic obstetric record (Fig. 2). This categorical nature of

the responses indicates a clear need for a system for electronic entry and collection of obstetric information.



**Figure 2. Attitudes towards the introduction of an electronic obstetric record**

We explored respondents' views on specific midwifery documentation in planning, organising and conducting activities in midwifery practice through an in-depth interview.

In order to preserve the anonymity of the interviewees, the health care professional respondents are represented by numbers P1 to P30 and the expert interviewees by numbers P31 to P40.

*"I fully support the introduction of an electronic obstetric record. I believe that the future lies in digitalization and this will make our work much easier" (P1).*

*"Electronic records have been used in Europe for a long time, we should introduce this practice in our country. After all, we work with young people who use digital devices all the time. It would be a convenience for all and medical professionals and patients to create such a record."(P2)*

*"My opinion is that this innovation is an excellent idea, but for the time being we should wait for its widespread integration."(P3)*

*"I fully support the idea. It would be a pleasure to work with an electronic file." (P4)*

*"I am not sure if the introduction of an electronic obstetric record will lead to the expected positive results. We have all witnessed the problems that have arisen with the introduction of electronic reviews in the NHIS". (P5)*

*"I fully support the idea. I think this is part of the future of the Women's Consultation". (P6)*

*"No, I am strongly opposed to it. It would just increase the computer work, at the expense of time with the patient". (P7)*

*"I support the concept of an electronic record. I think a right step towards improving the administration of care for pregnant women. In my opinion, work could be done towards its integration into the National Health Information System" (P31).*

*"Yes, it would be great. We have been fighting for midwives to have their own documentation for a long time and the electronic record would facilitate this mission of ours" (P33).*

*"Digitalization of healthcare is already a fact. Although in its early stages, this process has upended our notion of access to health information. The introduction of an electronic obstetric record has the potential to improve the quality of women's consultation, so I support this project." (P37)*

Because the management system includes tasks related to planning, competency assessment, documentation of actions performed, verification, reporting of results if necessary correction during the interview with experts we discussed the possibility of the electronic midwifery record to be based on a nursing care plan. In our opinion, this would ensure an individual approach, continuity and continuity of care. The experts unanimously supported the proposal, with 90% being adamant in their *position and only 10% that the proposed option was only partly good.*

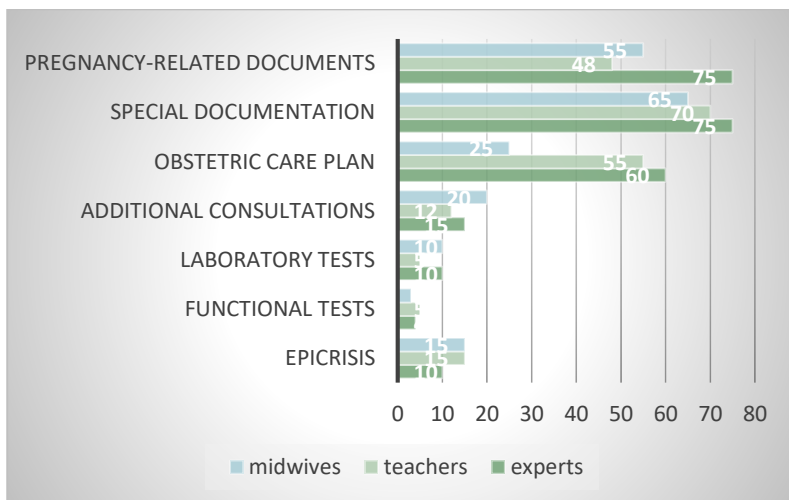
*"A nursing care plan is a good foundation on which to build a midwifery record. Our model documents for independent practices are also based on the nursing plan" (P38).*

*"The care plan is the best way to document the activities carried out. Nursing diagnoses are intended to identify specific conditions that are impacted by the HCP. It thus emphasises the autonomous activities of midwives" (P40).*

The positive attitudes identified provoked us to create a software product, the methodology for integrating this into practice is presented in Chapter Four. In order to meet the needs of those using it, we asked our respondents what information an electronic obstetric record should contain to benefit health care professionals in their work with patients.

A comparison of the answers given by respondents revealed a statistical correlation and a characteristic pattern. We have presented the aggregated opinion expressed by the respondents as a numerical expression of the need to include the relevant type of documents in the electronic obstetric record in Figure 3.

When the results were analysed, the following responses stood out - all maternal health programme, midwifery-specific documentation, obstetric care plan based on obstetric diagnoses, additional information from consultations and epicrisis (Fig. 3).



**Figure 3. Components of the electronic obstetric record**

*Note \*: Percentages exceed 100 due to more than one answer given*



*"At this stage, pregnancy records only contain outpatient lists and test results. This is extremely insufficient. In my opinion, the EOR should include all documents related to the pregnancy - AL, results, epicrisis, consultations with other specialists. A care plan and documentation specific to our activity should be mandatory" (P19).*

*"The electronic records should contain everything required by the Maternal Health Program, but also documents in which we reflect our activities and care" (P22).*

*"To emphasize the midwife's leadership role, our documentation should be included, not just that of the physicians" (P14).*

*"It is very important to get all the documents in one place, including our specific forms. This is the only way we can cover all aspects of pregnancy and ensure high quality care" (P30).*

*"It is imperative to include specialized documentation. This is the only way to bring the midwife to the fore as a key figure in the follow-up of a normal pregnancy" (P35).*

*"All documents are important, but few of them the activities of midwives. I therefore think that a care plan should be included, as well as other forms on which HCP can record their observations and judgements." (P36)*

*"In order to make a correct nursing diagnosis, the midwife must have access to all documents concerning a woman's pregnancy. Therefore, it would be most appropriate to endow the already existing NHIS record with our records" (P39).*

The difference between the means of these document types is statistically significant, which leads us to believe that the most important documents that should be present in the electronic midwifery record are the specialist forms and the care plan ( $p < 0.001$ ).

Of interest to us, was the result regarding the documents provided by the Maternal Health Program, which was almost equal to the number of responses given by experts and midwives in action, while for specialized documentation, the midwives' responses were displaced by those of the educators (Table 4).

**Table 4. Monitoring documentation**

| <i>Components</i> | <i>Responses</i> |                | <i>Percent of case</i> |
|-------------------|------------------|----------------|------------------------|
|                   | <i>N</i>         | <i>Percent</i> |                        |
|                   |                  |                |                        |

|                                  |    |       |       |
|----------------------------------|----|-------|-------|
| <i>Documents</i>                 | 35 | 52.5% | 36.6% |
| <i>Specialised documentation</i> | 55 | 75.8% | 45.4% |
| <i>Care Plan</i>                 | 48 | 60.3% | 36.5% |
| <i>Additional consultations</i>  | 18 | 20.4% | 12.2% |
| <i>Laboratory tests</i>          | 23 | 25.1% | 15.0% |
| <i>Imaging studies</i>           | 12 | 15.8% | 9.9%  |
| <i>Functional tests</i>          | 7  | 5.0%  | 3.4%  |
| <i>Epicrises</i>                 | 15 | 10.9% | 6.5%  |

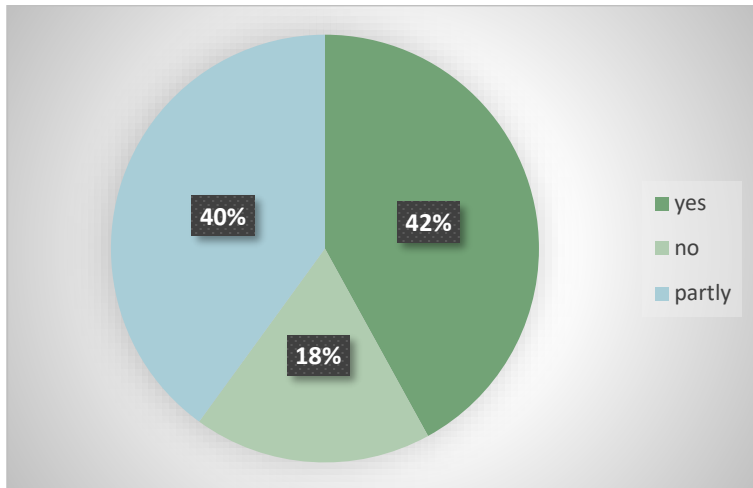
The obstetric model has proven to be the most effective way to provide care during pregnancy. In a number of countries, it is integrated into the health system and midwives are the lead health professional when it comes to normal pregnancy. In the developed countries of Europe, midwives have their own documentation that is equal in weight to that of doctors and together form the pregnancy record. The answers of our respondents give us reason to conclude that Bulgarian health care professionals consider the theoretical model of the midwifery care plan to be of equal importance with the documentation of the Maternal Health Care Programme.

The nursing process has stood out over the years for its effectiveness and efficiency. It is a scientific method of organizing care, a systematic way of identifying a patient's problems, on the basis of which to develop a plan of care that is aimed at resolving them. The nursing process is dynamic and cyclical. Its proper application requires skills characteristic of the midwifery profession, such as observation, consistency and clinical reasoning, and a good theoretical background.

Modern training programmes for students of midwifery include compulsory courses that provide fundamental training in the care of the body and all the necessary measures to protect health according to its holistic nature. "Philosophy and Introduction to Nursing and Midwifery Care. Theoretical Foundations" is a compulsory course that includes 75 lectures and 45 exercises. During its study, students acquire theoretical knowledge and practical experience concerning the mission and function of the modern midwife; models

of nursing and midwifery care; analysis and assessment of the patient's condition; nursing process; nursing diagnoses - stages and planning of midwifery care.

Of interest to us, were the views expressed by the academic tutors regarding students' knowledge of nursing diagnoses and care planning. A leading proportion of respondents felt that students knew diagnoses and could only plan 'in parts'. Nursing diagnosis differs significantly from medical diagnosis. Its correct diagnosis requires not only knowledge but also experience (Fig. 4).



**Figure 4. Students' knowledge of care plan  
(according to teachers)**

While a medical diagnosis most often names the disease and remains unchanged, a nursing diagnosis addresses a specific problem, whether real or potential. Our position is supported by the faculty who indicated that students were significantly more familiar with plan development and had experience gained during the learning process, 42%, (n=9). An almost equal proportion of participants felt that students had partial knowledge - 40%, (n=8), with the remaining 18%, (n=3), being adamant that students had no experience.

Nursing diagnoses and plan of care are major components of the electronic midwifery record, therefore of interest to us, was the view expressed by

practising midwives as to how confident they were in their skills. The highest proportion of respondents felt that they would be able to manage the development of a care plan. Given the fact that health care professionals actually implement the nursing process but do not document it, we assume a modest proportion of midwives who cannot judge.

*"Yes, I believe that years of experience have had an impact and I have no problem identifying the needs of pregnant women. Correctly identified nursing diagnoses prompt the necessary interventions" (P16).*

*"I don't think I will encounter any difficulties. The care plan is an important part of our work, no matter that in our country it is not yet accepted to write it down on paper" (P8).*

*"It is the nursing diagnoses that set us apart from the doctors. They deal in terms of disease, and we seek to embrace the woman in her wholeness and completeness. I think I will manage with making the plan" (P23).*

*"During our training we wrote care plans. I need to recall the algorithm, but I think I will manage." (P12)*

*"I haven't written a care plan since I was a student. I'm not sure I would be able to make one now without help" (P21). The need for help was confirmed by other interview participants.*

*"Oh, I've forgotten how to write a plan. I know there were nursing diagnoses but I definitely don't remember them. ... I won't cope!"(P26)*

The correlation coefficient: 0.256 and 0.257 indicates a weak straight relationship between the two variables nursing diagnosis skills and midwifery care plan development and the faculty judgment of these knowledge and skills of students. The coefficients can be considered statistically reliable - Significance  $p=0.038$  and  $p=0.266 < \alpha=0.05$  (Table 5).

**Table 5: Correlation between knowledge and skills of midwives and students**

| <b>Variables</b>  | <b>Correlation coefficient r</b> | <b>N</b> | <b>P</b> |
|---|----------------------------------|----------|----------|
| <b>Midwives working in outpatient LH</b>                    |                                  |          |          |
| Knowledge and skills to place an SD and prepare a care plan | 0.256                            | 30       | 0.038    |
| <b>Academics</b>  |                                  |          |          |
| Knowledge and skills to place an SD and prepare a care plan | 0.296                            | 20       | 0.266    |

The application of the nursing process requires the observance of strictly regulated stages for which midwives take responsibility for their actions, within the framework of acquired competencies. The nursing process requires health care professionals to make self-assessments as well as decisions related to patient interventions and, if necessary, patient education. Driven by a desire to be fully in the service of practice, we asked midwifery practitioners whether they considered it appropriate to have written guidelines for care for the relevant lunar months. The majority of participants felt that this would be helpful (70%). A fifth did not consider it necessary for a set of recommendations to be drawn up and 10% could not judge.

*"Our profession requires mentoring. I have a lot of experience and I don't think I will have any difficulty in drawing up plans, but I am not convinced that young colleagues will feel confident. I think it's good to have sample plans drawn up that can be adapted to individual patients' needs" (P9).*

*"Every pregnancy is individual, yet the care is quite similar. So I think it would be good to have ready-made plans to fall back on" (P15).*

*"There should be guides. At university we learn how to write a care plan but it's good to have templates" (P17).*

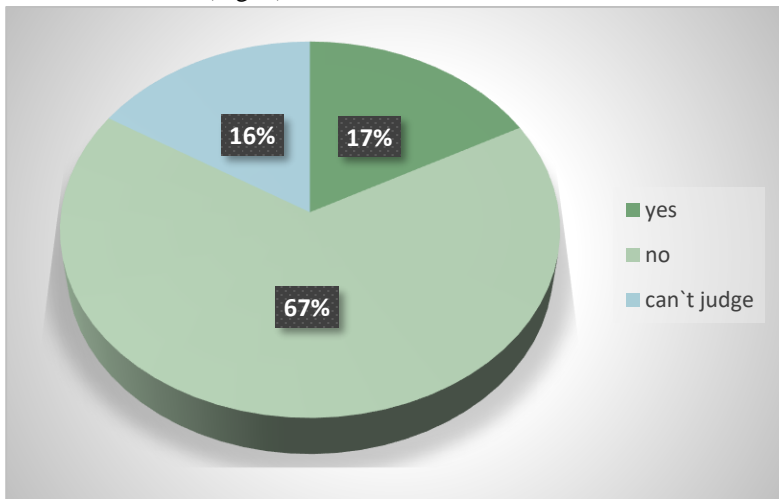
*"No, I don't think there should be a guideline. Our education includes enough hours of theory and practice so that when we go out into the job market we have enough skills in that."(P18)*

In response to the need of the midwifery lead, we compiled a set of sample ***Guidelines for the development of care plans related to nutrition in pregnancy, need to know, dehydration, nausea/vomiting, and anxiety.***

Global trends are defining activities aimed at limiting paper-based documentation and actively transferring data electronically. This is associated with a number of benefits of various kinds - the number of paper and ink used is reduced /it is more environmentally friendly/, space in the offices, which was previously used for archives, is freed, the problem of difficult to read handwriting is avoided, which in turn is a prerequisite for unintentional errors, respectively, a decrease in quality. Some computer knowledge is required to work fully with medical software.

In the curriculum for the training of students in the specialty "Midwife", included for study a compulsory discipline "Informatics". The preparation

includes 20 hours of lectures and 40 hours of exercises. The aim is for students to acquire knowledge and build skills to use information technology in professional practice. We asked the lecturers whether the students are sufficiently prepared to work with medical software. At a time when online communication occupies an essential part of our daily lives, and the pandemic of Covid-19 has become a prerequisite for a serious push for the development of distance learning, we are surprised to report that more than half of the respondents gave a negative answer (67%). Only 17% answered "Yes" and the rest could not decide (16%). In spite of the fact that during the theoretical training students do not have access to real software, we believe that in the course of practical training and during the first months of the work placement, these skills will also be acquired. Today's young professionals are characterized by adaptability and readiness to work with computers, but the analysis of results highlights the need for mentoring, which is embedded in the first stage of the qualification framework (Fig. 5).



***Figure 5. Students' skills for working with medical software (according to teachers)***

According to the experts, the theoretical training received in university education is sufficient for practicing midwives to be confident in their knowledge and skills graduate midwives (60%). A relatively small proportion of

interviewees admitted the likelihood of problems (20%). They assumed that difficulties would be of a technical nature.

*"In my opinion, midwives have enough experience in working with computers and I don't think they will encounter any difficulties" (P32).*

*"I don't think it will be a difficulty for midwives because medical software entered a long time ago" (P33).*

*"I think the electronic record can be made to intuitively meet the needs of midwives. So they won't be hampered in their work with it" (P34)*

*"Colleagues are used to computer technology but I assume some of the older midwives would need help getting used to the different interface" (P35)*

*"Honestly, I think there would be difficulties, more of a technical nature. We've all seen what's happened with the introduction of e-checks and in recent months e-prescriptions" (P36).*

*"I can't judge, but if colleagues were trained beforehand and given access to quality support, I think it would limit the risk of problems." (P40)*

We evaluated the correlation between faculty ratings of students' medical software skills and experts' ratings of midwives in action (EOR is a kind of software). The correlation coefficient: 0.256 and 0.257 indicates a moderate straight relationship between the two variables. The coefficients can be considered statistically reliable - Significance  $p= 0.038$  and  $p=0.266 < \alpha=0.05$  (Table 6).

Computer technology is constantly evolving and entering our daily lives in an avalanche-like manner. New requirements are introduced annually regarding the administration of health care in pre-hospital care. New components of the NHIS system are also to be introduced. This, together with the issue raised about mentoring, has given us reason to explore the extent to which there is a need for additional courses to enhance computer skills.

**Table 6: Medical software skills**

| <i>Variables</i>                     | <i>Correlation coefficient r</i> | <i>N</i> | <i>P</i> |
|--------------------------------------|----------------------------------|----------|----------|
| <i>Experts from BAPPG structures</i> |                                  |          |          |
| <i>Medical software skills</i>       | 0.256                            | 30       | 0.038    |

| <i>Lecturers University of Health Sciences, SC "Midwives"</i> |       |    |       |
|---|-------|----|-------|
| <i>Medical software skills</i>                                | 0.296 | 20 | 0.266 |

At present, the pregnancy monitoring file contains mandatory components that are subject to financial and factual verification by the NHIS and recommended. The mandatory ones include a pregnancy prevention card, outpatient lists from individual visits to pregnancy counselling and a copy of the results of the tests provided for in the Maternal Health Programme. It is recommended that the patient's record contain a copy of any additional consultations, laboratory and imaging tests and any other documentation relevant to the course of the pregnancy.

Because the electronic obstetric record is intended to include fields and charts for all of the above documents, it was our interest whether the proposed software product could supplement or replace the current record. Tests of independence were performed using the  $\chi^2$  method assuming that responses were evenly distributed. The value obtained for this question was  $\chi^2=0.157$

More than half of the respondents felt that the EOR should replace paper records (54%). Slightly lower, but still statistically significant, was the number of midwives interviewed who felt that the digital device was the better option to complement paper media (40%). Part of the reasoning for the position expressed is related to the material availability of the respective practice.

*"In the age of digitalization, I believe that the electronic obstetric record should replace paper records entirely" (P10).*

*"It would be much better if everything was electronic. Why do we have to write the same things on paper and on a computer?" (P11)*

*"I definitely think paper files should be a thing of the past. It is much more convenient if everything is kept electronically. An electronic file would do a great job in this respect." (P13)*

*"In our practice the midwives do not have a separate computer and we have to wait for the doctor to complete our records. I think this will lead to unnecessary prolongation of the examination time. So it is better to keep the documentation in parallel" (P20).*



*"I honestly can't judge. On the one hand, it would be great to do away with double typing, but on the other hand, if everything is kept only on a computer we will be totally dependent on it."(P24)*

*"It's better to have everything on paper and electronically. It will be safer that way" (P25).*

One of the aims we set ourselves in developing an electronic obstetric record was to facilitate access to information between the different members of the multidisciplinary team providing care for the pregnant and/or gynaecologically ill woman.

We asked all study participants who should have access to the EOR information. Not surprisingly, the top response was "everyone" who is directly involved. Respondents also recognised the need for external consultants to be accessed by midwives. Only by sharing the original documents can the correct transmission of information, the correctness of the results of examinations and manipulations and last but not least the quality of patient education be guaranteed.

In June 2022, the first module of the NHIS was launched - the electronic examination, outpatient lists, referrals for consultations and medical diagnostic activities, which are generated by the personal doctor and the outpatient doctor and sent electronically. A few months later, the software of the medical institutions was also connected and the referrals for hospitalisation became electronic. Of course, there is no shortage of errors, and some of them were related to the access that is provided, through the electronic signature of the physician-executor. All this, and given the involvement of various medical professionals in the care of pregnant women, provoked us to ask the midwives who, in their opinion, should provide access. We took the position that the patient as a unifying figure could provide access, but analysis of the responses indicated that this should be provided ex officio through the NHIS. More than ¼ of midwives could not judge and only 10% supported us. During the interviews, another approach became clear - access should be provided through patients and the service route at the same time. 14% of midwives agreed around this idea.

*"In my opinion, this should be done in a ministerial way. It will be much easier, comfortable and familiar" (P27).*

*"It would certainly be much better if access was provided ex officio. There's no point in burdening the patient with that responsibility as well." (P29)*

*"I'm adamant that we should have access provided ex officio." (P30)*

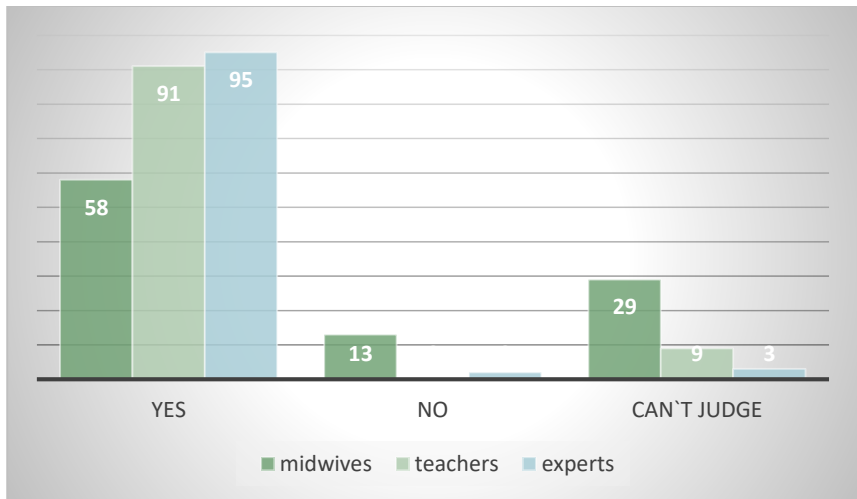
*"Both options have their advantages. On the one hand, if the patient authorizes us, then they will have more control over who sees what of their record. On the other hand, he has to think about how it will be handled if the patient is a minor" (P22).*

*"I can't judge. Both options have pros and cons. On the other hand, having both options, through the service and through the patient, gives more freedom" (P2).*

*"Patients may not always be able to provide access, so there should be an option for this to happen through the service route as well" (P16).*

*"For me access through the patient is not an option. In this way we medical staff find ourselves in a subordinate position and we have to work as a team. So it's best either way." (P20)*

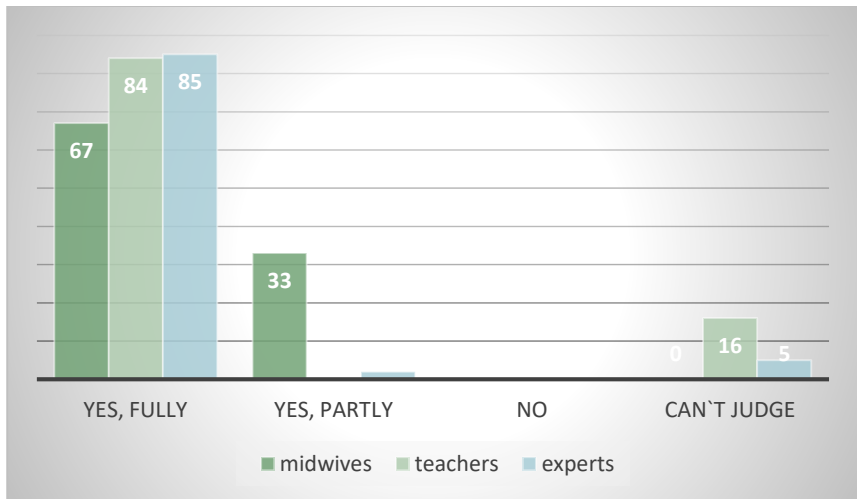
The concept of regulating health care through medical standards is not new. Today they are accepted as part of the pillars on which healthcare is based. The BA has created a draft medical standard for health care, but it has not yet been ratified. In general, there are no regulations concerning documentation for health care professionals. However, the authors are of the opinion that this badly needs to be corrected to ensure the quality of health care services provided. When asked about the possibility of including the electronic midwifery record in the regulations, the majority of midwives felt that this was necessary (57%). A significant proportion of respondents could not decide (29%). There is a similarity with the responses given by lecturers - 91% felt that it was good to have the care plan guidelines included in regulations. Experts, support the need for legal regulation of specialist documentation (Fig. 6).



***Figure 6: Incorporation of the electronic obstetric record into the normative document***

Another significant problem that we hope to contribute to solving with the integration of EORs into actual medical software is the lack of tools to differentiate midwifery pay.

Of interest to us, was the answer to the question regarding the possibility of considering EOR as a good tool for valuing midwifery labour. Across the three groups of respondents, the highest proportion of positive responses was experts (80%), followed by midwives (60%) and academic preceptors (58%). In the course of the in-depth interview, a not small group emerged among midwives who did not fully support the thesis of EOR being a tool in documentation (27%). Unfortunately, the medicalized model of care in Bulgaria is antonymous to the midwifery model, which has proven to be effective (Fig. 7).



**Figure 7. The electronic midwifery record as a means of unlocking midwives' potential**

It was important for us to investigate whether the introduction of EOR would impact on the respect that midwives receive. Across all three groups of participants, the overwhelmingly positive view was. In analysing the responses, we found hesitation and uncertainty among midwives. Even negative opinions are encountered. In our opinion, this is due to the different type of work organisation, the limited possibilities to perform independent activities and, last but not least, the strong domination by doctors.

### **1.2 SWOT analysis of the electronic obstetric record concept**

Electronic medical records, hospital management software, medical center software, proper reporting to the health fund, and all new regulations to the NHIS are becoming the norm. Technology is changing the traditional approach to operations and data management and holds the promise of better medical services with a positive impact on patient experience. Opportunities abound, but so does risk. Driven by our desire to fully analyze the concept of an electronic obstetric record, we applied the SWOT analysis method. Through it, we highlighted the critical success factors for an electronic obstetric record. We

identified the weaknesses of the project which, if not eliminated or reduced to a significant extent, would hinder the integration of the record into actual medical software. The preponderance of possibilities and strengths of the idea give us reason to believe that it is feasible in practice.

***SWOT analysis of the electronic obstetric record concept***

| <b><u>Strengths</u></b>   | <b><u>Weaknesses</u></b>  |
|---|---|
| <ul style="list-style-type: none"> <li>• Data viewability</li> <li>• Labour and care differentiation</li> <li>• Reducing the volume of paper documentation</li> <li>• Reduction of consumable costs</li> <li>• Freeing up office space by eliminating the need for paper storage</li> <li>• Increasing the quality of care offered</li> <li>• Availability of error-proof controls</li> <li>• Reduction of documentation processing time</li> <li>• Patient access to the full volume of documentation</li> <li>• Quick access to all documents</li> <li>• Better care planning</li> <li>• Availability of PHC-specific documentation</li> <li>• Option to upgrade and develop the interface</li> <li>• Automated processes and availability of hyperlinks allow for more efficient management of midwives' working time</li> </ul> | <ul style="list-style-type: none"> <li>• Need for changes in medical software</li> <li>• Inability to send data to NHSIS</li> <li>• Dependency on the internet</li> <li>• Care plan development not embedded in routine practices</li> <li>• Need for training to work with new plugins /obstetric record/</li> <li>• Need for methodological support in working with the new components</li> <li>• Lack of support</li> <li>• Lack of automatic backups</li> </ul> |
| <b><u>Opportunities</u></b>   | <b><u>Threats</u></b>   |
| <ul style="list-style-type: none"> <li>• Easy integration into the current medical software</li> <li>• Full deployment of obstetric potential</li> <li>• Strengthening the autonomy of the midwife</li> <li>• Positive effect on the public image of the midwife</li> <li>• Facilitating communication between different professionals</li> </ul>   | <ul style="list-style-type: none"> <li>• Insufficient computer literacy</li> <li>• Risk of personal data leakage</li> <li>• Inaccurate identification of obstetric problems</li> <li>• Need for maintenance and updating</li> <li>• Underestimation of midwifery knowledge, skills and judgement</li> </ul>   |

|  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Requires the presence of a midwife in the obstetric office.</li><li>• Ability to issue documentation in remote consultation</li><li>• EOR can be used by midwives working in independent units</li><li>• Implementation of documentation specific to midwifery care</li><li>• -Ability to complete a greater volume of information</li><li>• Ability for multidisciplinary teams to develop a care plan</li><li>• Ability to network with a common database</li><li>• Electronic record can be Cloud based</li></ul> |  |
|--|--|

## **IV. ELECTRONIC MIDWIFERY CARE MANAGEMENT SYSTEM - PRACTICAL APPLICATION**

### **4.1. Electronic health record - international experience and good practices in Bulgaria**

#### ***4.1.1. International experience in the implementation of an electronic patient record***

The process of increasing economic, social, technical, political and cultural interconnections and relations between countries poses new challenges for health care delivery. Digitisation of healthcare is a natural response to globalisation. Developed countries are setting the benchmark for healthcare organisation and are forcing new approaches including the creation and implementation of electronic patient records. The US is leading the way in integrating telemedicine, which requires similar software products to function fully. In doing so, they are setting the standard for care for a variety of conditions. This is extremely valuable for developing countries that, driven by their desire to integrate best practices, tend to make mistakes by misinterpreting the roles of certain groups of medical professionals [145].

The ability of people to move and reside freely within the European Union is part of the individual and collective rights guaranteed by the signing of the Maastricht Treaty in 1992. The first provisions concern the free movement of workers, followed by Directive 2004/38/EC, which also covers their family members. This raises questions about healthcare and, in particular, the transfer of medical data. In response to the information needs of medical professionals from different countries, the concept of an International Patient Summary (IPS) was born. It is a minimal, constantly updated, set of basic clinical data that can be easily used for any clinician to provide unplanned care (Fig. 8).



***Figure 8. Structure of the International Patient Summary  
(adapted from reference №157)***

The data can also be successfully used for elective events (patient movements between countries, births abroad) and as the basis for different types of electronic health records.

According to the official IPS website, the availability of standards for electronic health information is essential when developing software of this scale. The theoretical analysis found that the International Patient Summary is a document developed jointly by multiple standards development organizations (i.e. CEN, HL7, IHE, ISO and SNOMED) and is actively supported by international initiatives such as the Global Digital Health Partnership (GDHP), G7, G20 and the World Health Organization (Fig. 9).

In the development of the IPS, we find a condition for its effective implementation and evaluation, which is aimed at identifying the features of the locally operating standard and discovering the specific needs concerning: the IPS stages formulated; the role of terminology; the formats used; the IPS testing capabilities.

The analysis of electronic health records establishes compliance with a logical sequence, a clear structure and quick access to important information. The IPS is the basis on which other software products are being developed and increasingly used even in conventional medicine.



## International Patient Summary (IPS) Viewer for Connectathon

Links to [published Implementation Guide](#), the [latest CI build](#) and [Connectathon-2 branch](#).

Please note that this tool is an open-source project under development. It only renders the following sections of IPS bundles: Allergies, Immunizations, Medications,

### Submit Data

This is for test data only. **Please do not submit PHI.**

Paste your IPS here:

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Try a sample

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### View IPS

|  |  |
|--|--|
| <b>Header</b>  | <b>Patient</b>                                   |
| <b>Patient Summary as of December 11, 2017 14:30</b><br>Summary Date: 2017-12-11T14:30:00+01:00  | Birth Date: 1972-05-01<br>Name: Martha, DeLarosa |
| <b>Allergies and Intolerancies</b>   |  |
| <b>allergy - medication - Criticality: High</b><br>Substance with penicillin structure and antibacterial mechanism of action (substance) (373270004) |  |
| <b> - Criticality: undefined</b><br>undefined (no-known-food-allergies)  |  |
| <b>Active problems / Diagnosis</b>   |  |
| <b>S018</b> Menopausal flushing (finding) (198436008)  |  |

**Figure 9. Visualization of International Patient Summary**

We find that more and more countries are recognising the benefits of IPS and developing their own electronic dossiers. To facilitate the work of medical professionals and respond to the needs of patients, the information in the records is also accessible via smartphone apps. In Europe, some developed countries are building on this concept with condition-specific apps. A pioneer in this field is the UK, which is developing a virtual platform for the transfer of pregnancy tracking data, thus ensuring quality and continuity of care, even when women migrate internally [142]. Patient satisfaction is increased and modern communication channels are used effectively. This innovative practice is being embraced by more and more health facilities, leading to the phasing out of the need for paper-based documentation. Advances and proven best practice for

obstetric documentation in the UK provide the rationale for this analysis of traditional documentation accompanying pregnancy follow-up.

The UK has a long history of institutionalised midwifery. Over the years, the way care is documented has changed dramatically. To date, the so-called Maternity Care Book still exists. The care information is presented in two parts. The first part is intended for the patient and is informative. It is a kind of guide to the course of a normal pregnancy, vaginal birth and care in the first days of the baby's life at home. The changes in the body are presented in an accessible way, explained by week and graphically depicted. There is a separate article on the differences between a normal singleton pregnancy and an uncomplicated multiple pregnancy. Emphasis is placed on a healthy lifestyle. The correct ratio between different food groups is illustrated, and information on the need for supplementation with certain micronutrients is included. In discussing the book, we find a section on the impact of bad habits on fetal development. An idea that we consider to be apt is the included plan for smoking cessation (Fig. 10).

In our opinion, the information presented in tabular form, which includes minor complaints common during pregnancy, is a successful coping strategy. Non-medication methods and preparations from the class of OTC (Over-the-counter drugs - a heterogeneous group of products that are not under the strict control of the regulatory agency in a given country) are listed prominently. Medicines with proven safety are included as 'Plan B'.

План за действие за спиране на тютюнопушенето

1. Помислете:

- Колко Ви струва да пушите?

---

---

- За какво друго бихте могли да харчите тези пари? Как можете да погледите себе си или бебето си със спестените пари?

---

---

- Какво Ви кара да пушите?

---

---

2. Действайте:

Избройте Вашите пет основни причини да спрете да пушите:

- ✓ \_\_\_\_\_
- ✓ \_\_\_\_\_
- ✓ \_\_\_\_\_
- ✓ \_\_\_\_\_
- ✓ \_\_\_\_\_

***Figure 10. Smoking cessation plan  
(Adapted from literature source #173)***

The fourth column indicates medical devices that are prohibited for use by pregnant women. Analysing the document, we believe that the availability of the information presented supports the activities of midwives by facilitating their counselling for common conditions (Table 7).

When creating such a tool for Bulgaria, it is necessary to take into account the specificities of the health system, access to health services, the availability of pharmacies and the competencies of midwives for independent activities.

**Table 7: Recommendations for the selection of remedies to manage common minor ailments (adapted from reference 173).**

| <b>Type of complaint</b>   | <b>First choice</b>                            | <b>Second choice</b>                                      | <b>Do not use!</b>                               |
|----------------------------|--|---|--|
| <b>Constipation</b>        | Increase fibre in the menu                     | Lactulose on the recommendation of a medical professional | Preparations containing senna (mother leaf)      |
| <b>Diarrhoea</b>           | Sachets for oral hydration                     | Medication at the discretion of a medical professional    | Loperamide                                       |
| <b>Haemorrhoids</b>        | Cold compresses                                | Soothing creams, suppositories                            | Preparations prohibited for use during pregnancy |
| <b>Runny nose</b>          | Steam inhalation, washes with saline solutions | Single applications of xylometazoline or oxymetazoline    | Phenylephrine or pseudoephedrine                 |
| <b>Allergic rhinitis</b>   | Antihistamine sprays                           | Intermittent doses of loratadine or chlorphenamine        | Other antihistamines                             |
| <b>Headache, toothache</b> | Paracetamol                                    | Ибупрофен само през втория триместър                      | Codeine, codidramoth, dihydrocodenel.            |
| <b>Cough</b>               | Tea with honey and lemon                       | Homeopathic products, OTC                                 | Preparations that contain codeine                |
| <b>Acids</b>               | Apple, milk                                    | Antacids, omeprazole                                      | Preparations containing aluminium                |
| <b>Vaginal infection</b>   | Over-the-counter preparations                  | Clotrimazole on doctor's recommendation                   | Fluconazole                                      |

The analysis of the available data from electronic records gives us reason to propose the creation of similar Guidelines in the practice of health care professionals.

The guideline also includes information on appropriate types of physical activity and sport. The correct way of wearing a seat belt in a car is clearly presented. We believe that such a practice could be adopted, as our own study in September 2022 found a number of misconceptions about the safety of pregnant women in vehicles, both in terms of wearing a seatbelt and its location in the vehicle. Under the legislation in this country, women in advanced pregnancy are allowed not to wear a seat belt, and nowhere do we find a specific time limit set for this. This allows for loose interpretation and omissions that can lead to a fatal end.

At this stage, the digital version of the electronic obstetric record does not contain such a component, but could be upgraded with an application of an informative nature. The example of English midwives is a good justification point.

When analysing the second part of the Maternity care book, we find a documentary character and similarity to the Bulgarian pregnancy prevention card, but with more in-depth information. Midwives record information on the course of pregnancy - abdominal circumference, blood pressure values, weight changes. We also find information on laboratory and instrumental test results. A large proportion of practising midwives in England work with this paper-based document.

In the context of the digitisation of health care, much more interesting is the opportunity that some of the HCP trusts are giving their clients. This is an app through which the expectant mother can access all the electronic records relating to her pregnancy. The most common ones are ***My pregnancy notes and Badger Notes care record***. My pregnancy notes is website that provides access to an electronic obstetric record via an email address and password. In it, users find information about obstetric notes about the progress of pregnancy. A section is provided through which women can inform the selected hospital about the upcoming birth, what and related preferences. We also find an electronic calendar where the date and time of upcoming appointments with the midwife and doctor are noted. The content of the app stores information about previous consultations, as well as sections of information leaflets, divided by thematic content.

Of interest to us is the ***Badger Notes app***, which provides real-time access to all records related to pregnancy, birth, newborn and children in general. Encryption is applied when the collected data is transmitted from the midwife to the respective medical facility, thus ensuring confidentiality.

The app is available for free installation on a smartphone or tablet from the App store and Google play. To create an account, a username is required, a password which is provided by the midwife tracking the pregnancy and a phone number to which a PIN is obtained are validation of the respective account.

Analyzing the content of the Badger Notes application we find several main components.

The first of these is the Care Plan, where the midwife generates individual care plans. In turn, pregnant women can track what activities to expect in the corresponding gestational week.

The second component relates to pregnancy follow-up. The information that is collected and reflected is related to: personal data: *name, address, contact number, national health insurance number, contact details of next of kin and partner; contact details of the midwife monitoring the pregnancy, GP, clinic for consultations and hospital type facility providing the option of delivery; detailed medical history and family history; probable due date and dates for consultations; results of laboratory tests, screening tests and ultrasound examinations; data from consultations; charts on intrauterine fetal development; birth plan*

The third component is called *Conversations*. Through it, patients can communicate with medical professionals. Pregnant women can send their comments and questions about antenatal care, birth plan and home visits to the puerperium in real time.

We believe that the above practice, facilitates in building a relationship based on trust, which is extremely valuable and relevant to the course of pregnancy, has an effect on the degree of anxiety about the upcoming birth.

The last part is the *Library*, which contains informative leaflets. These are organized by topic and aim to answer the majority of questions pregnant women have.

In our view, having access to evidence-based, research-based information makes midwives' jobs easier by allowing health care professionals to focus on specific issues for the patient in question.

The app also allows for a quick overview of all the more important components of the antenatal consultation. The data are presented in tabular form and arranged chronologically (Table 8).

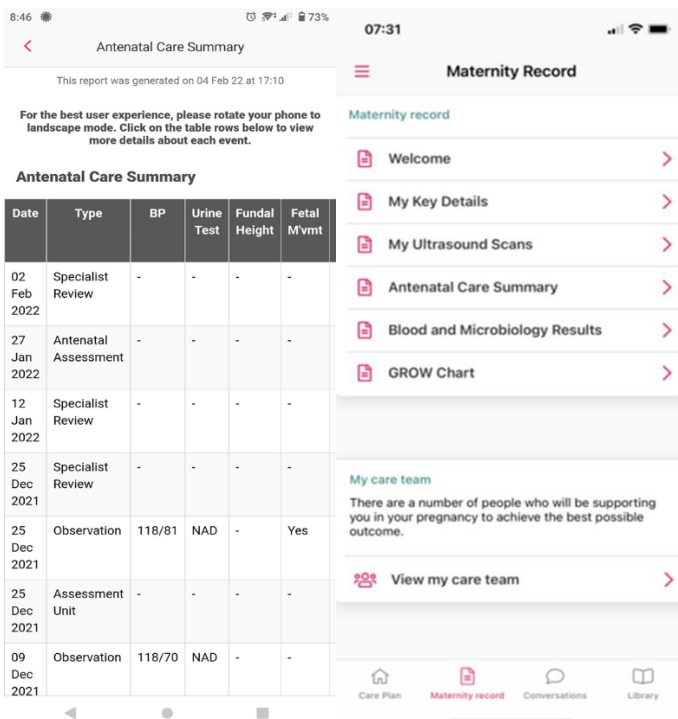
**Table 8: View summary of pregnancy follow-up data adapted from reference №151**

| <b>Date</b>       | <b>Type of review</b> | <b>BPD</b> | <b>Urinalysis</b> | <b>Height of the uterus</b> | <b>Children's movements</b> |
|-------------------|-----------------------|------------|-------------------|-----------------------------|-----------------------------|
| <b>02.02.2022</b> | Doctor                | 24 mm      | Normal            |                             |                             |
| <b>27.01.2022</b> | Midwife               |            | -                 | 20 sm                       | Yes                         |

|            |         |       |        |    |    |
|------------|---------|-------|--------|----|----|
| 26.12.2021 | Mifwife |       | -      | 16 | no |
| 12.12.2021 | Doctor  | 16 mm | normal |    |    |

We also find the application important and practical in situations where a multidisciplinary team is required. Medical professionals who are not directly involved in pregnancy follow-up can easily navigate through the data and fully develop their expertise.

Access to the information, via the patient's smartphone, eliminates the need for paper, minimizing the risk of losing a valuable document. The app also contains a glossary of common abbreviations in obstetric practice regarding pregnancy and birth tracking. This allows the patient to better understand the information provided and, consequently, to make better informed decisions.



#### ***4.1.2. Specific obstetric documentation in Bulgaria***

In 2021, the Bulgarian Association of Health Care Professionals issued a ***Methodology for the Activities of Freely Practicing Nurses, Midwives, Rehabilitators, Paramedics and Physician Assistants***. The document contains the regulatory framework, the requirements for individual and group practices, and sample forms for specific documentation.

The specific competences of each profession, including midwifery, are outlined *provision and collection of health information; health promotion, disease prevention and prevention activities; medical and health care; re-socialization, re-adaptation and rehabilitation; manipulation; emergency, humanitarian and other activities.*

The analysis of the sample forms developed to support midwives' activities focused on: *midwifery care record; maternal and child health centre consultation card; maternal and child health centre consultation card; maternal and child health centre consultation card.*

#### ***Obstetric care record***

The midwifery care record consists of four separate components and has a tabular structure. In the first part, we find information about the patient collected through subjective examination. The fields are clearly structured, distinguished by their detailed nature and logical consistency. They are aimed at obtaining information on: *the patient's administrative data; social data; reasons for registration; patient's complaints; past and present illnesses; allergological history; heredity; epidemiological history; gynaecological history; harmful habits; ability to self-care; other relevant information.*

The form starts with fields for *administrative purposes* - it includes the name of the midwifery unit; the name, surname and PIN of the midwife; date and part of registration of the patient.

In the *"Patient Administrative Data"* column, we find the content of two valuable paragraphs - it is provided to note the telephone number of relatives, which is extremely necessary when the patient is a minor, incapacitated and/or insane, and to highlight the source of information.



The '*Social information*' box includes data that have not been reflected in other similar documents. The midwife is expected to collect and analyse specific details such as financial situation, living conditions, hobbies and interests. The woman's marital status and with whom she is currently living is to be indicated. This again highlights the complex nature of the activities of health care professionals. Although direct care is directed at pregnant women, midwives' activities are often directed at all members of the nuclear family.

We find it appropriate to suggest that the 'Reasons for registration should be located 'immediately after the administrative details as the purpose of the encounter influences the need for the specific details provided in the 'Social Information'.

An interesting point is that when listing the reasons for attendance there is no option for '*pregnancy follow-up*'. Given the name of the form itself, this is the logical reason for creating a file. In our opinion, a more appropriate option would be to fill in a separate sheet for single visits (example - administration of manipulations prescribed by a doctor, monitoring of vital signs, etc.).

### ДОСИЕ ЗА АКУШЕРСКА ГРИЖА

|   |   |
|---|---|
| Наименование на акушерската структура:            |   |
| Име, фамилия и УИН на акушерката:                 |   |
| Дата на регистриране на пациентката:              | Час на регистриране на пациентката:   |
| ИНФОРМАЦИЯ ЗА ПАЦИЕНТКАТА /Субективно обследване/ |   |
| 1.Административни данни на пациентката            | Име, презиме, фамилия ..... година<br>Адрес по лична карта:.....<br>ЕГН ..... ЛК.....<br>Телефон на пациентката..... Телефон на роднина.....<br>Източник на информация: /да се подчертае/<br>Пациентка, семейство, медицински персонал, медицинска документация, др. източници  |
| 2. Социални сведения                              | Образование:.....Професия /подчертай/: ..... ученичка, безработна, работеща<br>Месторабота (ако работи):.....<br>Професия:..... Длъжност:.....<br>Наличие на здравна осигуровка: <input type="checkbox"/> ДА <input type="checkbox"/> НЕ<br>Семейно положение: <input type="checkbox"/> омъжена <input type="checkbox"/> неомъжена <input type="checkbox"/> разведена <input type="checkbox"/> вдовца<br>С кой живее в момента:.....<br>Материално положение /да се подчертае/: благоприятно, удовлетворително, неудовлетворително<br>Условия на живот: /тип жилище, етаж, асансьор и др./.....<br>Условия на труд /да се подчертае/: добри, удовлетворителни, лоши<br>Професионални вредности: <input type="checkbox"/> ДА <input type="checkbox"/> НЕ<br>Ако да, опишете.....<br>Увлечения, хоби.....   |
| 3.Причини регистрация                             | за<br><input type="checkbox"/> информация за бременността<br><input type="checkbox"/> информация за развитието на плода<br><input type="checkbox"/> подготовка за раждане - изготвяне на план за раждане<br><input type="checkbox"/> обучение на родителите и подкрепа за отговорно родителство<br><input type="checkbox"/> подготовка за осъществяване на грижи за новороденото в домашни условия.<br><input type="checkbox"/> изготвяне на хранителен режим<br><input type="checkbox"/> изготвяне на двигателен режим<br><input type="checkbox"/> хигиена на бременността<br><input type="checkbox"/> прилагане на манипулации назначени от лекар<br><input type="checkbox"/> проследяване на жизнени показатели.....<br><input type="checkbox"/> извършване на кардиотографски запис<br><input type="checkbox"/> други дейности.....<br><input type="checkbox"/> .....<br><input type="checkbox"/> ..... |

**Figure 11. Obstetric care record  
(material provided by BHP)**

The following column "Patient's complaints" is clearly structured and allows to easily follow the course of the disease/condition. Health care professionals are expected to fill in the onset of the problem, the progression of symptoms, complaints to date, treatment effectiveness.

Analyzing the available literature, we consider it appropriate to include an Allergy Table in the structure of the file. Due to its clinical relevance, it is appropriate to list drug allergies.

As an innovative solution, we consider the inclusion of the column "Self-care ability". The authors have indicated possible "yes" and "no" answers, but we would add a "partially" option.

The last column is labelled "Other relevant information (research)". Here the blood group and Rh factor of the woman should be noted. Space is provided

to note results of tests for HIV and Hepatitis B. In our opinion, it would be more convenient for the analysis of the condition if the virology results were available in the "Epidemiological history" column, which includes data on hepatitis and other infections.

The second component of the obstetric care record is entitled '*Status at registration (objective examination)*'. This part of the form is also in tabular form and is divided into eight segments according to the basic human needs formulated by Florence Nightingale.

In our opinion, the proposed structure facilitates the work of health care professionals - it is only necessary to mark what is applicable to the specific case or to fill in a value. The individual indicators are listed following the logical flow of the review. This reduces the risk of omission (Fig. 12).

The last part of the document relates to the information provided about the patient or family. Midwives can mark the sources used. Analyzing the structure of the obstetric record, we take the liberty of suggesting supplementing the information with the following steps: *description of obstetric status; interpretation of the cardiotocographic recording performed; documentation of counseling related to contraception, family planning, birth plan preparation, and so on.*

| СЪСТОЯНИЕ ПРИ РЕГИСТРИРАНЕ НА ПАЦИЕНТКАТА   |   |   |
|---|---|---|
| /Обективно изследване/ - нужното се маркира   |   |   |
| <b>I. ДИШАНЕ И ХЕМОДИНАМИКА</b>   |   |   |
| Оценка тежестта на състоянието <input type="checkbox"/> добро <input type="checkbox"/> удовлетворително <input type="checkbox"/> средно тежко |   |   |
| <input type="checkbox"/> тежко  |   |   |
| <b>Дихателна система:</b>   | Самостоятелно дишане:   | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | Характер на дишането:   | <input type="checkbox"/> дълбоко <input type="checkbox"/> повърхностно <input type="checkbox"/> ритмично <input type="checkbox"/> аритмично<br><input type="checkbox"/> шумно <input type="checkbox"/> свободно <input type="checkbox"/> затруднено |
|   | Задус:  | <input type="checkbox"/> ДА /инспираторен, експираторен, смесен/<br><input type="checkbox"/> НЕ Ползва ли инхалатор: /колко често/ _____  |
|   | Необходимо ли е кислород  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | Кашлица:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ<br>Ако да, характер на храчките: <input type="checkbox"/> серозни <input type="checkbox"/> гнойни <input type="checkbox"/> кръвенисти <input type="checkbox"/> пенести                      |
| Необходимо ли е специално положение в леглото:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ                           |   |
| <b>Сърдечно-съдова система:</b>   | Пулс: честота _____ ритмичност _____ форма _____ натъпленост _____                |   |
|   | Напрежение _____ Големина _____ дефицит на пулса _____                            |   |
|   | АН: на дясна ръка/ _____ на лява ръка/ _____                                      |   |
|   | Отоци: <input type="checkbox"/> ДА <input type="checkbox"/> НЕ Локализация: _____ |   |
| <b>II. ХРАНЕНЕ И ПРИЕМ НА ТЕЧНОСТИ</b>  |   |   |
| <b>Хранене</b>  | • Способност да яде и пие самостоятелно:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Има ли зъби:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Има ли сваляци се зъбни протези:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Диета   |   |
|   | • Предпочитания към храни   |   |
|   | • Необходимост от консултация с диетолог:   | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Апетит:   | <input type="checkbox"/> непроменен <input type="checkbox"/> снижен <input type="checkbox"/> липсва <input type="checkbox"/> повишен  |
| <b>Прием на течности</b>  | • Жажда:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Прием на течности:  | <input type="checkbox"/> достатъчно <input type="checkbox"/> ограничено <input type="checkbox"/> много <input type="checkbox"/> малко   |
|   | • Гълтане:  | <input type="checkbox"/> нормално <input type="checkbox"/> затруднено   |
|   | • Език:   | <input type="checkbox"/> чист <input type="checkbox"/> обложен <input type="checkbox"/> сух <input type="checkbox"/> влажен   |
|   | • Дъх от устната кухина:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Повръщане:  | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Гадене:   | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Оригване:   | <input type="checkbox"/> ДА <input type="checkbox"/> НЕ   |
|   | • Характер на повърнатите матери:   |   |
| • Подкожна - мастна тъкан /изразеност/  |   |   |

**Figure 12. Patient registration status  
(material provided by BHP)**

The third component of the midwifery care file is the so-called "Work Plan". Like the other parts of the form it also has a tabular view. It is modelled on the nursing care plan.

We consider the next part, the Midwifery Protocol, to be an extension of the Work Plan. It consists of three charts - a date, an action plan and performance tick boxes including the patient and midwife's signature. A good option is to have the patient acknowledge the care received by her signature. The Midwifery

Protocol and Plan of Care components create an opportunity for continuity of activities tracking the progress of the plan, as well as an opportunity for the patient to be a full partner in the care and outcomes achieved.

The "*Midwifery Activity Protocol*" is an extension of the work plan. It consists of three charts - a date, an action plan, and check marks for completion, including patient and midwife signatures. The possibility that the woman confirms the care received through her signature is a good approach suggested by the experts. Documentation is needed to objectify the information and the ability to track the care provided.

### ***Consultation card (for a woman in labour)***

The map is structured in tabular form. It can be conventionally divided into two parts. The first part of the document is informative. The identification of the patient is provided by names and SSNs. Data are collected on the mode of delivery, the presence of surgical interventions, the date and time of delivery. There is a separate column with data on the child at birth - sex, weight and height. An interesting element is that the experts from the BAHF have provided an opportunity to note who referred the woman to the Maternal and Child Health Centre. The suggested options are obstetrician, general practitioner, herself or another.

We believe the information is particularly valuable for the practice manager. The approach creates an opportunity to analyse the consumer journey and use the results to develop strategic PR and marketing plans. Another significant opportunity is to create a network of partners and multidisciplinary teams of health care professionals.

The second part refers to the activities carried out. It is planned to measure vital signs (height, weight, blood pressure, respiration, oedema), fundus uteri height and to analyse the lochia and the condition of the surgical wound (if any). Assessment of micturition, defecation, self-esteem, physical and psychological status of the parturient and description of the therapy prescribed. We find appropriate the separate column of recommendations for management, through which the independent role of the midwife is affirmed.

Early childhood nutrition represents an extremely important part of child care. With regard to lactation, we find boxes describing the condition of the breast, the nipple and breastfeeding technique. The role of breastfeeding as a

public health factor has seen a significant increase in recent decades and is reflected in a number of documents such as the National Health Strategy, National Programmes and Plans. We consider breastfeeding counselling to be extremely important and for this reason suggest that it should be documented on a separate form from the electronic obstetric record. The document ends with a chart to indicate the date of the next visit. A space is provided to indicate where the current encounter was implemented, either in a health facility or in the patient's home (Fig. 13).

*Наименование на акушерската структура*

Име: \_\_\_\_\_

Адрес: \_\_\_\_\_  
Телефон: \_\_\_\_\_  
Email: \_\_\_\_\_

**ЦЕНТЪР ЗА МАЙЧИНО И ДЕТСКО ЗДРАВЕ**  
Изпълнение на индивидуалните акушерски програми

**КАРТА ЗА ОСЪЩЕСТВЕНА КОНСУЛТАЦИЯ /за родилки/**

Име на родилката: \_\_\_\_\_ ЕГН: \_\_\_\_\_

Адрес: \_\_\_\_\_  
Пациентка е насочена към Центъра от: Лекар АГ ОПЛ само други

Начин на разрешение: \_\_\_\_\_  
Дата и час на раждане: \_\_\_\_\_

Хирургична интервенция по време на раждане: \_\_\_\_\_  
Данни за новороденото при раждането/

|     |       |      |
|-----|-------|------|
| пол | тегло | дълж |
|-----|-------|------|

Медицински или други причини, налагащи извършване на дейностите в здравно-консултативния център

Осъществени дейности:

1. Живени показатели на родилката:

|   |   |    |       |       |
|---|---|----|-------|-------|
| Р | Т | РП | Делно | Отоци |
|---|---|----|-------|-------|

2. Височина на fundus uteri: \_\_\_\_\_

3. Локви:

|            |            |         |
|------------|------------|---------|
| Вид /цвет/ | количество | матрица |
|------------|------------|---------|

4. Състояние на оперативна рана /ако има такава/

5. Мекция

6. Дефекация

7. Лактация

|                     |                      |                    |
|---------------------|----------------------|--------------------|
| Състояние на гъдата | Състояние на зърното | Техника на кърмене |
|---------------------|----------------------|--------------------|

7. Физическо състояние на родилката:

8. Самочувствие и психическо състояние на родилката

9. Приемане на храна и течности

10. Терапии /ако има такава/

Препоръки за поведенение

Консултатията е осъществена: на дата \_\_\_\_\_ в Центъра \_\_\_\_\_ в дома \_\_\_\_\_

Дата за последващо посещение /ако е необходимо/

Име, явни, УИИ и подписи на специализирани, осъществили консултатията:

Подпис на пациентка / родител/настойник/ в удостоверение на това, че е информирана за дейностите, които са извършени:

1. Име: \_\_\_\_\_ УИИ: \_\_\_\_\_ подпис: \_\_\_\_\_  
2. \_\_\_\_\_

**Figure 13. Consultation card (for parturient)  
(material provided by BHP)**

The card is to be signed by the health care professional who carried out the consultation and the patient.

### **Consultation card (for newborn)**

The general condition, emotions and attitudes of the woman giving birth have an impact on the newborn and vice versa - the baby's condition, nutrition and sleep-wake schedule have a bearing on the woman's recovery. The card, includes identification of the child and mother through names and SSNs. Brief

information on the mode of delivery, date and time of birth is filled in. We believe that collecting information regarding the course of pregnancy, medical or other reasons requiring activities is a prerequisite for successful counselling (Fig. 14).

Примерен формулар (B)

Наименование на институцията структура

Лого Адрес: Телефон: Елпощ:

**ЦЕНТЪР ЗА МАЙЧИНО И ДЕТСКО ЗДРАВЕ**  
Канцеларство на европейската интеграцион проект

**КАРТА ЗА ОСЪЩЕСТВЕНА КОНСУЛТАЦИЯ (за новородено)**

|  |   |         |   |         |
|--|---|---------|---|---------|
| Име на новороденото: _____ ЕГН: _____  |   |         |   |         |
| Име на майката/бащата: _____ ЕГН: _____  |   |         |   |         |
| Адрес: _____   |   |         |   |         |
| Пациента в настоящия център от: _____  |   |         |   |         |
| Учен на родоразрешение: _____  |   |         |   |         |
| Дата и час на раждане: _____   |   |         |   |         |
| Тяжестта на раждането / Ръстът на раждането: _____   |   |         |   |         |
| Медицински или други причини, налагащи изключване на майката в Здр.авно-консултативен център / Обществене дейности: _____          |   |         |   |         |
| 1. Общи състояния на бебето (жизнени показатели):<br><table border="1"> <tr> <td>Р</td> <td>Т</td> <td>Диспнея</td> </tr> </table> |   | Р       | Т | Диспнея |
| Р  | Т | Диспнея |   |         |
| 2. Измерване на телесна и ръст на бебето   |   |         |   |         |
| 3. Рески на хранене и ориентация на зърването и крампното позиция, както на заслушване, честота.                                   |   |         |   |         |
| 4. Състояние на кожа и пеленави (пелени остатък)   |   |         |   |         |
| 5. Къпане и тоалет   |   |         |   |         |
| 6. Масажи  |   |         |   |         |
| 7. Облекло   |   |         |   |         |
| 8. Масажи (колко пъти на ден)  |   |         |   |         |
| 9. Дефекационен пътя на даня, консистенция, цвят   |   |         |   |         |
| 10. Общ тонус и рефлекс  |   |         |   |         |
| 11. Рески на отпояване - бързина, сън, резиден и заместване  |   |         |   |         |
| 12. Чрезно или ниско тонажи  |   |         |   |         |
| Препоръки за поведени  |   |         |   |         |
| Консултативна в осъществяване на даня, _____ в даня _____ в даня _____   |   |         |   |         |
| Дата на последната посещение (даня в център) _____ (за се посещения)   |   |         |   |         |
| Име на лекаря УМБ и лекар на специализирана, осъществяване консултативна: _____  |   |         |   |         |
| Подпис на пациента / родителите/бащата в удостоверяване на това, че е информиран за дейността, както се извършва:                  |   |         |   |         |

**Figure 14. Consultation card (for newborn)**  
(material provided by BAHF)

In the analysis of the Chart we also find the following information: general condition of the baby (height, weight and breathing); measurement of the baby's weight and height; feeding regime and correction of suckling and feeding; condition of skin and mucous membranes (umbilical residue); bathing and toileting; massage; clothing; micturition; defecation; general tone and reflexes; care regime (waking, sleeping, walking and tempering); therapy.

We believe that for a more complete determination of general condition, information on body temperature and pulse could also be added to the chart. In conclusion, we can summarise that the information in the cards is clearly and clearly structured. In our opinion, most of the items mentioned can be included

in the electronic obstetric record. The data collected can be built upon, especially in terms of contraceptive counseling, to maximize effective activities and care.

***Documentation of the Independent Obstetric Practice Unit at Medical centre Chaika, Varna***


In 2015, the Law on Medical Institutions underwent an amendment. In accordance with the provisions of Regulation No. 1 of 08 February 2011 on the professional activities that nurses, midwives, associate medical specialists, dental technicians and health assistants may perform by appointment or independently, a specific obstetric documentation Checklist and Pregnancy Diary was prepared and agreed with a specialist in medical law.

Analyzing the documentation, we find that the Checklist is modeled after the Outpatient Checklist from the NHIF primary documents. It contains sixteen charts, some of which are similar to those in the doctors' documentation (Fig. 15).

The first part contains patient identification data with a serial number and date notation. In our opinion, there is a risk of duplication and/or omission of serial numbers, which requires the maintenance of an additional log of patients passed. Completing the checklist entirely manually is time consuming due to the need to duplicate the information being completed (copy for health care professional, copy for patient, log entry).

A significant point is the lack of a nursing diagnosis. Instead, it is intended to record obstetric status and to indicate any co-morbidities.



|  |   |   |  |
|--|---|---|--|
|  <b>ДНЦ „ЧАЙКА“ ЕООД – ЗВЕНО ЗА САМОСТОЯТЕЛНА АКУШЕРСКА ГРИЖА</b><br>Варна, ул. „Никола Вапцаров“ №2    052 786 900; 0878 312 884<br>e-mail: akusherki_dkcchaika@abv.bg |   |   |  |
| Пациент/три имена/.....<br>Адрес:.....<br>ЕГН/ЛНЧ:..... GSM:.....  | <b>КОНТРОЛЕН ЛИСТ</b><br>№ ____ Дата: ____  |   |  |
| Акушерски статус:.....<br>Придружаващи заболявания:.....<br>Акушерска анамнеза:.....   |   |   |  |
| <b>Обективно състояние:</b><br>.....<br>.....  | <b>Акушерски статус:</b><br><input type="checkbox"/> АН..... Тегло.....<br><input type="checkbox"/> ВМ..... ДСТ.....<br><input type="checkbox"/> ОК..... Позция.....<br>Пелвиометрия:<br><input type="checkbox"/> D.sp..... D.cr..... D.th..... C.ex..... |   |  |
| <b>Ациенти:</b><br><input type="checkbox"/> .....<br><input type="checkbox"/> .....<br><input type="checkbox"/> .....  | <b>Съвети:</b><br><input type="checkbox"/> .....<br><input type="checkbox"/> .....<br><input type="checkbox"/> .....  |   |  |
| <b>Терапия:</b><br>Назначена от др. .... унит. ....<br><input type="checkbox"/> .....<br><input type="checkbox"/> .....<br><input type="checkbox"/> .....  | <b>Консултации:</b><br><input type="checkbox"/> .....<br><input type="checkbox"/> .....<br><input type="checkbox"/> .....   |   |  |
| <b>Дейности:</b><br><input type="checkbox"/> Пренатална консултация<br><input type="checkbox"/> Женска консултация<br><input type="checkbox"/> План за раждане   | <input type="checkbox"/> Греници за новородено<br><input type="checkbox"/> Греници за гърдите<br><input type="checkbox"/> Запис на ДСТ<br><input type="checkbox"/> Матернал за МБИ  | <b>Вид консултации:</b><br><input type="checkbox"/> Партерна<br><input type="checkbox"/> Вторична | <b>Вид посещения:</b><br><input type="checkbox"/> Амбулаторно<br><input type="checkbox"/> Домашно<br><input type="checkbox"/> За манипулация |
| Информирана съм за необходимите дейности, дадени препоръки и очакваните резултати. При възникване на остри и тежки състояния ще се обвързва със специалист АГ или ОПГ/У  |   | Име и фамилия:.....<br>УНИТ:.....<br>акушерка:.....   |  |
| Пациент.....<br><i>(подпис)</i>  |   |   |  |

**Figure 15. Checklist**  
*(material provided by the Unit for Independent Obstetric Practice at MC "Chaika").*

This hinders the possibility of a complete and correct description of the patient's condition. Nursing diagnosis is applied by all allied health professionals and enables similarity in coding and working in multidisciplinary teams. This is also important in terms of digitizing the encounters and manipulations already performed. We find a lack of standardization of the recordings, which risks misinterpretation of the information collected.

The Checklist provides items for recording obstetric history, objective status and obstetric status. We consider it a mistake to use the definition "obstetric" as history taking is a mandatory element of care for both pregnant and gynaecological patients. It is usual for the history to consist of a general and

a specialised part, containing information from different fields, and the totality of the data determines the approach, type and quantity of care provided.

In addition to the usual objective status column, the checklist has an 'obstetric status' column, which is itself part of the description of the objective status. Its separate completion is a duplication of existing information and is unnecessary in the case of gynaecological patients. Leaving blanks in a formal document could leave the patient with an unpleasant feeling of omissions in the documentation of the encounter with the personal doctor. Another problem appears to be the name of the column itself, which is already present with a different meaning in the sheet.

According to the analysis, the "*Highlights*" and "*Tips*" charts are interchangeable and could lead to confusion for both the patient and other medical professionals. We consider it more appropriate to restructure and rename the 'Therapy' column. The above document requires the transcription of the physician's therapy, which is redundant and takes away from the health care professional's time. Instead, there could be only one field provided for documenting the recommendations made according to the midwives' independent competencies.

Completion of the "*Supplies*" column is relevant to the process of accounting for services rendered. Accounting for them in the course of documenting patient encounters requires additional time and activities.

It is intended to note the type of consultation and visit as well as their purpose, and a suggestion has been made that the relevant activity be checked off. In our opinion, this is useful information needed for the preparation of financial, statistical and other reports. We consider it appropriate to indicate all the activities that are regulated as independent and are authorised by the regional health inspectorate to be carried out in the respective medical institution.

Another element of the Checklist of interest to us was the statement "I have been informed of the required activities, the recommendations made and the expected results. In case of acute and severe conditions, I will refer to a specialist OBG or personal doctor accompanied by a patient signature. This ensures the patient's acceptance of the information provided and could be seen as a tool to protect medical professionals in the event of legal action.

In our opinion, the checklist is an attempt to create a specific obstetric documentation with its own strengths and weaknesses. To date, the midwifery

file builds on this document many times over, saves effort for the PHCs using it, facilitates the process of administering services and enables midwives to reach their full potential, responding to their specific needs when dealing with different types of patients.

### ***Pregnancy diary***

The second document produced for the activities of the Independent Midwifery Care Unit is the 'Pregnancy Diary' and is an attempt to produce a midwifery record. It is intended to be used primarily by pregnant women and kept by them. It is based on the Mutterpass document developed in Germany. The diary consists of two hard covers and 12 pages. On the first cover important dates for the pregnant woman are filled in - last regular menstruation, probable date of delivery and date of delivery itself.

The first four pages contain information from the women's consultation for the corresponding lunar month. In our opinion, it would be a good option to have a larger number of these, as visits become more frequent in the third trimester (two consultations each in lunar months IX and X).

The values of blood pressure, body weight, abdominal girth, uterine height and the values of the infant heart tones (from the V lunar month) are filled in the diary monthly. This would be useful for patients who do not bring a checklist from the previous examination to the follow-up visit. It also enables pregnant women to track the values of relevant indicators and present them to other medical professionals.

There is space on the relevant page for patients to record their complaints and questions arising between visits. In our opinion, this enables the time of the examination itself to be used more fully. The mother's diligent keeping of the diary involves her in the pregnancy follow-up process and places her in an active position, which is in line with the obstetric model of care.

We find overlapping information in the 'Tips' and 'Highlights' graphs. We believe they could be merged and cover the same amount of information provided. We are impressed by the space provided for the application of a photograph/report of ultrasound examination and recording of infant heart tones. This is a great initiative that is a prerequisite for better teamwork with the obstetrician. It would be helpful for the practice to add a field for the midwife to record her own interpretation of the recording results.

✓ VIII ml      дата: .....

RR.....  
T.....  
OK.....  
FU.....  
ДСТ.....

УЗД

NST

Оплаквания:.....  
.....  
.....

Съвети:.....  
.....  
.....

Въпроси:.....  
.....  
.....

Акценти:.....  
.....  
.....

The Pregnancy Diary is an innovative tool that incorporates modern concepts such as the Birth Plan. Although not very popular in Bulgaria, it is essential for the mother. Providing information on the duration and specifics of the different periods of labour reduces the level of anxiety and puts the woman at the centre of events. The opportunity to share her expectations and to adapt them to the reality of the hospital ensures the woman's cooperation, which is key to her active participation and assistance during labour.

ПЛАН НА РАЖДАНЕ

✓ I период:.....  
.....  
.....  
.....

✓ II период:.....  
.....  
.....  
.....

✓ III период:.....  
.....  
.....  
.....

The birth plan consists of several elements and is oriented more towards the first period of childbirth. It often includes information regarding environmental features - dim light, availability of music, scented candles; preferences regarding examinations and investigations - recordings of infant heart tones, pelvic examination and cervical disclosure; presence of an accompanying person, etc. The diary contains three charts - first, second and third period, without additional instructions for completion, which gives freedom of interpretation and

use by the health professional, but when not completed has no informative and/or guiding value for patients. It would also be particularly useful in relation to maternity teams due to the lack of clearly spelled out expectations of the pregnant woman.

The next part of the Pregnancy Diary is practically oriented and extremely valuable for expectant mothers. It is called "Prepare what to carry" and consists of three charts: necessary luggage for the mother, for the baby and documents for admission. The clear list structure and clear layout of the page is helpful to the patient and helps to build trust in the midwives.

ПРИГОТВИ КАКВО ДА НОСИШ

За мама:

✓ \_\_\_\_\_

✓ \_\_\_\_\_

✓ \_\_\_\_\_

✓ \_\_\_\_\_

За бебе:

✓ \_\_\_\_\_

✓ \_\_\_\_\_

✓ \_\_\_\_\_

✓ \_\_\_\_\_

Документи:

✓ \_\_\_\_\_ ✓ \_\_\_\_\_

✓ \_\_\_\_\_ ✓ \_\_\_\_\_

✓ \_\_\_\_\_ ✓ \_\_\_\_\_

✓ \_\_\_\_\_ ✓ \_\_\_\_\_

At the time of writing, eHealth is not yet a reality. The documents required for delivery were issued by the obstetrician-gynaecologist during the Women's Consultation and/or by the family doctor. The number of these is not small and this often leads to confusion among patients. The documents developed for the purpose of the activity of the Independent Obstetric Care Unit at the Medical centre Tchaika . include the necessary information for admission to the Maternity Unit - referral for hospitalization, outpatient list, exchange card, ID card, copy of blood group and Rh factor test, current Hepatitis B, Syphilis and

HIV tests (optional).

The last sheet of the diary is provided for your own notes. The last cover is shaped like a pocket for pregnant women to keep other documents. In conclusion, we can summarize that the diary is good practice for the midwife's activities in outpatient care. Currently, the development of a Birth Plan is not a component in the electronic midwifery record, as this concept is not yet applicable to all hospital settings in the country. In the future, the document would be an appropriate document in a developed software product.

### ***The midwife's handbook***

Dimitrova (2021), published a "Patron Midwife's Handbook" which contains forms designed to facilitate documentation of home visits. What is specific about them, which necessitates analysing them independently, is the extreme detail and attempt to single out as separate consultations, the midwifery

care in the puerperium. For the first time, a contraceptive counseling form is presented and provision is made for assessing risk factors and identifying risk of postpartum depression. The diary is based on documents from the United Kingdom, which have been adapted to the peculiarities of the Bulgarian health care system.

The analysis of the available obstetric documentation related to postpartum care shows the need to identify patients and collect information about the birth during the home visit itself. In the Patron Midwife's Diary we find a new, innovative approach. In it, the midwife completes a "Home Visit Request Form," thus collecting baseline data before the actual appointment. Regarding personal data, the midwife fills in information about the applicant's name, telephone number and address. The date of the request and the scheduled date/time for the visit are filled in. The problem for which the patient desires a home visit is noted. In addition to the usual date and mode of delivery, the specifics of the hospital stay shall be filled in on the request. For the first time, a form concerning patronage care is provided to fill in who will attend the home visit and space is left for additional comments. In our view, midwives need this kind of information as they often perform teaching functions not only for the parturient but also for other family members.

### ***Data about the mother***

In terms of the maternal data collected during the home visit, we find a great similarity with those provided in the Maternal Consultation Card (a document developed by BAHP). The form is presented in tabular form and requires the following information: *woman's name and age; details of delivery; indicators of general condition - temperature, pulse, blood pressure; condition of breasts - redness, pain, rashes, inflammation; level of fundus uteri; lochia - quantity, colour, odour; puerperium - inflammation, swelling, pain; condition of operative wound (if present); extremities (swelling, cramps, redness); defecation; micturition; pain syndrome.*

What is different from the existing documentation is the collection of information regarding the psycho-emotional state of the parturient, evidence of excessive fatigue (sleep problems, exhaustion). Charts have been added on risk factors - alcohol intake, smoking (includes detailed breakdown on behaviour

during pregnancy, at present and usual for the family); presence of chronic diseases; social status and possible single motherhood (Fig. 16).

### ОЦЕНЪЧНА СКАЛА НА РИСКОВИТЕ ФАКТОРИ

Отбележете вероятните рискови фактори в Табл. 2.

|     |   |
|-----|---|
| 1.  | Възраст над 35 г.   |
| 2.  | Паритет $\geq 3$  |
| 3.  | ВМИ $\geq 30$   |
| 4.  | Хипертензивни състояния по време на бременността вкл. Pre-eclampsia |
| 5.  | Дълъг безводен период (ранно разкъсване на ОМ)                      |
| 6.  | Продължителност на втори период $\geq 1.5$ часа                     |
| 7.  | Прилагане на форцепс/вакум екстракция                               |
| 8.  | Секцио кезарез  |
| 9.  | Непълно отделяне на плацентата или ципите                           |
| 10. | Тегло на бебето при раждане $\geq 4000$ g                           |
| 11. | Висока температура и неразположение                                 |
| 12. | Епизнотомия/разкъсвания втора степен                                |
| 13. | Трета/четвърта степен на разкъсване на перинеума                    |
| 14. | Липса на спонтанно уриниране повече от 3 часа                       |
| 15. | Еднократна катетеризация  |
| 16. | Постоянен катетър за $\geq 24$ часа                                 |
| 17. | Липса на подкрепа   |
| 18. | Настоящи проблеми с менталното здраве                               |
| 19. | Проблеми с менталното здраве в миналото                             |
| 20. | Фамилна анамнеза свързана с тежки перинатални ментални проблеми     |
| 21. | Остра кръвозагуба   |
| 22. | Тютюнопушене  |
| 23. | Антенатална антикоагулантна терапия                                 |
| 24. | Тромбофилия   |

Табл. 1. Рискови фактори

| Направление                                      | Номер на фактора от табл. 1 |    |    |    |    |    |    |    |    |    |    |
|--|-----------------------------|----|----|----|----|----|----|----|----|----|----|
|  | 5                           | 8  | 9  | 11 | 12 | 13 | 14 | 15 | 16 | 21 | 22 |
| Опасност от инфекция                             |                             |    |    |    |    |    |    |    |    |    |    |
| Опасност от абнормално кървене                   | 2                           | 4  | 9  | 11 | 23 | 24 |    |    |    |    |    |
| Опасност от развитие на хипертензия              | 1                           | 3  | 4  |    |    |    |    |    |    |    |    |
| Опасност от уринарна и/или фекална инконтиненция | 2                           | 6  | 7  | 10 | 12 | 13 | 14 | 15 | 16 |    |    |
| Опасност за психологическото благосъстояние      | 17                          | 18 | 19 | 20 |    |    |    |    |    |    |    |

Табл. 2. Оценка на рисковите фактори

**Figure 16. "Rating scale of risk factors" source "Handbook of the midwife", D. Dimitrova, Sofia, 2021**

The larger volume of primary data will allow the midwife to refine the nursing diagnosis and to develop a plan of care that is adequate for the specific needs of the patient. The tabular appearance of the form creates an opportunity

for record review and could easily be transformed into part of an electronic midwifery record.

The midwife's diary also includes additional materials that would facilitate the work of health care professionals. We find it appropriate that data on the general and mental state of the mother be supplemented by an assessment of direct and indirect risk factors. In the Handbook we also find an assessment scale consisting of 24 indicators that are grouped into five categories. Through these, it would be easy to diagnose hidden and manifest hazards of different nature. Another aid is the Edinburgh Postnatal Depression Scale. We believe that the tools developed could be digitised into a mobile app, similar to the platform analysed for midwives in the UK. In our view, ensuring data transfer to the electronic midwifery record would improve the quality of midwifery care in the country.

### ***Home visit formulas for a newborn***

Documents related to the home visit also include a newborn form. Its first part is related to the collection of anamnestic data. Some of the fields overlap with those of the 'Home visit request'. This further highlights the strengths of the electronic obstetric record. Here, the available information is automatically filled in all documents that require it. Most charts in this form are framed as questions. They can be conventionally divided into three groups - questions relating to pregnancy, childbirth and hospital stays; about the organisation of care at home; and queries about parents' attitudes to health issues. The digitisation of the paper forms will allow some of the answers to these questions to be self-completed by the mother. Due to the sensitive nature of some of the queries, more comfort and frankness could be provided to patients in this way.

The newborn child examination data is provided to be completed on a separate form which consists of two pages. In the first part of the document, signs are presented in tabular form and a column for highlighting notes. The individual indicators follow the logical sequence of the traditional examination - general appearance, skin and visible mucous membranes, head, neck, trunk, limbs, reflexes.

On the second page, midwives can document the advice given as well as report on its implementation. The space provided for comments is extensive and sufficient. The document concludes with charts on the length of the appointment,



setting a next visit and costing the current consultation. The ability to capture the duration is excellent and corresponds with the need for timekeeping of obstetric activities to be spelled out in regulations. The introduction of a "time" criterion could help determine the quality of the consultation performed. The introduction of EOR in practice will contribute to solving this problem through the possibility of working in real time.

### ***Consultation on breastfeeding***

One of the innovations we find in the analyzed document is the creation of a formula for breastfeeding counseling. We pay special attention to this process as it has a proven positive effect on a number of socially relevant issues. The provision of specialised counselling within the framework of patronage care would assist mothers in overcoming common problems in the early months that are usually the cause of early cessation of breastfeeding.

The questionnaire is divided into five parts, two of which are organisational in nature and the rest practical. The first part of the document is for identification purposes - the mother's name and date of visit are given. The next three parts deal with specific breastfeeding issues. Breast examination, breast milk quantity assessment and breastfeeding technique are provided. In order to facilitate the midwives, criteria by which the assessment is to be carried out are given. Space is also provided for additional comments. The final section allows for free text notation of problems identified and the specific advice given. Finally, there are boxes for setting a next visit and reporting the length of the consultation.

## **4.2 Methodology of an electronic obstetric record**

**The electronic obstetric** record is one of the options for managing obstetric care, through an electronic system. It includes documentation specific to midwifery activities and supports tracking over time of problems encountered, interventions implemented and outcomes achieved.

The nursing care plan has proven its effectiveness over the years. At its core, it is a tool for care planning, implementation and evaluation. Due to the clear structuring of identified problems and the possibility of constant updating, the nursing care plan ensures continuity of care. Due to its applicability in different sectors of medicine, it allows for multidisciplinary teamwork by the

PCP. All this gives us the reason to place it at the centre of the Electronic *Midwifery Record developed*.

To achieve the objective, we selected an appropriate database management system (DBMS). A DBMS is a set of computer programs that control the construction, maintenance, and use of databases. Existing database management systems provide a variety of functions that enable the management of the database and the data itself, which can be classified into four main functional groups: data definition - creating, modifying and removing the definitions that define the organization of the data; modification - inserting, modifying and deleting the actual data; retrieval - providing information in a form directly usable or for further processing by other applications. The extracted data may be provided in the same form in which it was stored in the database or in a new form obtained by modifying or combining existing data from the database.

Administration - logging and monitoring users, enforcing data security, monitoring performance, preserving data integrity, dealing with the concurrent control and recovery of information that has been corrupted by some event such as an unexpected system crash.

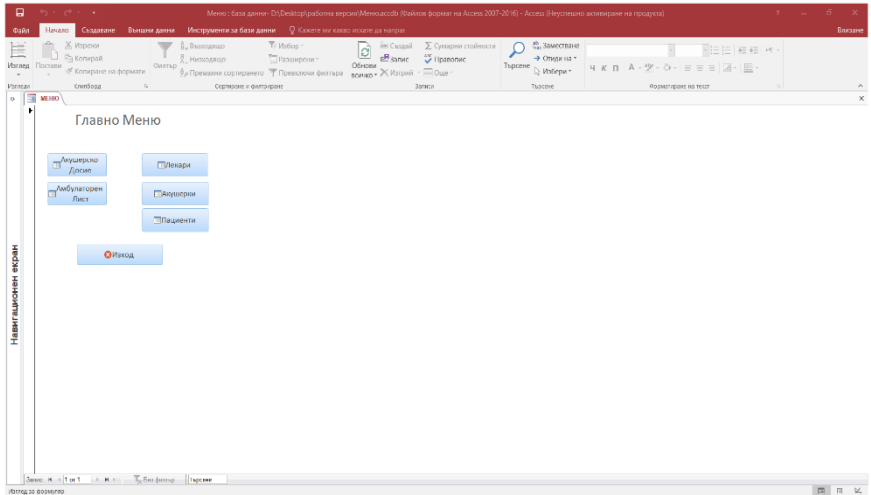
Examples of such DBMSs are Microsoft SQL Server, MySQL, PostgreSQL, Access, Oracle, Paradox, dBase, FoxPro, Cliper, Sybase, Informix. Some of them are user-oriented programming environments, while others are more like languages for creating and describing databases. The Microsoft Access program is a typical example of a user-oriented database management program. Database management systems create, process and maintain well-defined data structures. There are three types of data organisation and relationships between them (called database models): hierarchical, network and relational, thus distinguishing hierarchical databases, network databases and relational databases. The most popular is the relational model, in which data are organized into tables between which relationships (called relations) are established.

Microsoft Access is an application program for managing relational databases. It is used to create new databases, open, view, use, and process information stored in relational databases of the appropriate format. Access stores data in .mdb format databases, but can import or export data in dBASE, EXCEL, XML, LOTUS, PARADOX, IIS, ASP, RTF, TXT formats.

This program is notable for its flexibility and changes can be added or made to the database as needed. This is of utmost importance given the dynamics with which the requirements of midwifery practice are changing. Last but not least, data processed with Access can be in direct connection with database tables developed by other platforms /software for specialist doctors/. In this way, once information has been filled in / e.g. medical history / could be automatically copied into other forms. This saves the time of entering data once already filled in and provides more of this valuable resource for patient counselling.

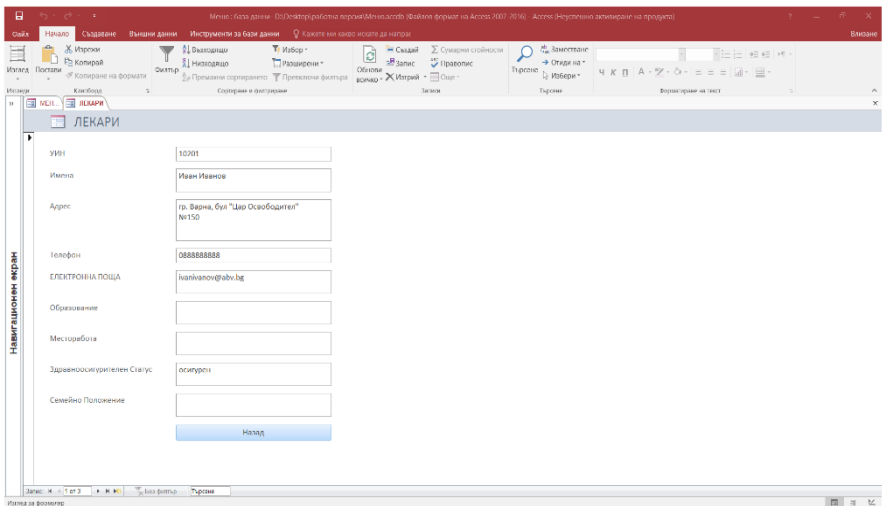
All of this provided the rationale for selecting Microsoft Access to create the electronic obstetric record. In order to be as realistic as possible in the creation of the EOR we used the Microsoft software product Access. In the hierarchy it is positioned between Excel and SQL Server. As it is part of the MS Office suite it enables quick data exchange with Excel and publishing of reports and/or outpatient lists to Word. This program is notable for its flexibility and changes can be added or made to the database as needed. This is of utmost importance given the dynamics with which the requirements of midwifery practice are changing. Last but not least, data processed with Access can be in direct connection with database tables developed by other platforms /software for specialist doctors/. In this way, once information has been filled in / e.g. medical history / could be automatically copied into other forms. This saves the time of entering data once filled in and provides more of this valuable resource for patient counselling.

When the electronic system is started, the main interface called "Main Menu" is displayed (Fig. 17). From it one can navigate to the modules "Doctors", "Midwives", "Patients", "Midwife's record", "Outpatient list". The return to the main view of the file is via the "Back" button.



**Figure 17. Main menu**

**The "Doctors" module** contains detailed systematized information on all obstetricians working in the facility or with whom the respective midwife works (Fig. 18).



**Figure 18. Module "Doctors"**

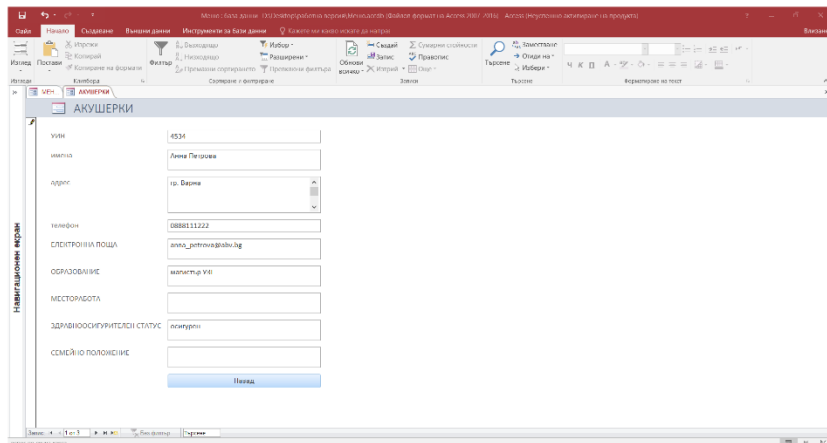
For each medical specialist there is to be a separate profile consisting of three parts - compulsory, recommended and additional. The mandatory elements refer to personal information - Unique Identification Number (UIN) and names on the ID card. For better communication, it is recommended that fields relating to the address of the relevant practice; contact telephone number and email address are completed. Optional additional specialties and second place of employment may be indicated.

The collection of these data is relevant to their automatic completion in the outpatient sheet, which is compulsorily filled in at each examination. This is done by means of hyperlinks.

**The Midwives module** contains detailed information about each midwife working in a health facility (Fig. 19). The data are presented in graphical form and are divided into three categories - mandatory, recommended and additional. The charts for mandatory information are PIN and names on ID card. The recommended information refers to phone number and e-mail

Each midwife has her own profile from which she records the care she has provided. The doctor, head midwife/nurse or other verifying body can track

all care registered for a patient. Working with individual profiles in the Midwife module is also a good choice for group practices of general practitioners. They can contract with health care professionals who have registered stand-alone midwifery practices and again easily track registered procedures.

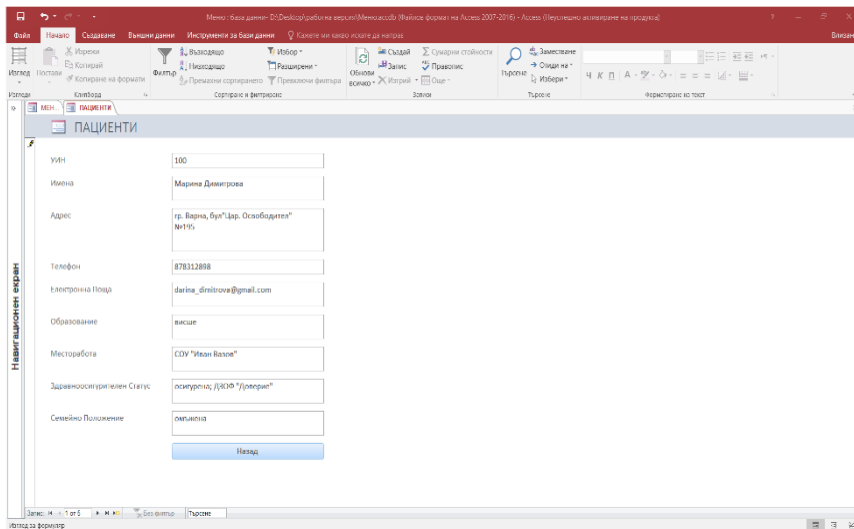


**Figure 19. Module "Midwives"**

*The Patients module* is probably the most important in terms of administering personal data. According to the Personal Data Act, it is necessary for every medical facility to be a data controller and to follow the appropriate protocols for the protection of medical information that is classified as sensitive. For this reason, only information that does not need to be protected is listed in this electronic record. Additional fields are provided that can be filled in if necessary and/or desired to facilitate communication - telephone, e-mail. In order to ensure comfort and to avoid technical errors when issuing sick notes, it is possible to fill in the place of work details already in this module. Subsequently, these data can be filled in automatically in the course of work. It is important to note that complete medical record keeping requires personal ID card data - name and address and SSN. If the EOR is desired to be integrated into the software of the respective medical facility and given the adaptability of the chosen platform, this module can be easily adjusted to respond to the needs of the respective data controller.

Examples are the fields for patient education, marital status and health insurance status. Again for convenience in the course of the work, in the health insurance status column, data for an additional health insurance fund can be filled in.

The Patients module allows to systematize all persons from the patient list of the medical institutions based on some data. It is mandatory to fill in only the names of the respective patient. All other fields are optional, but their completion will facilitate the work of medical professionals (Fig. 20).



**Figure 20. Patients module“**

Medical documentation is also an important part of communication between doctors, health care professionals and patients.

In our opinion, a significant problem is the lack of a normative act that contains a complete list of the documentation that accompanies the care provided.

In creating the electronic obstetric record, we have tried to cover all aspects of outpatient obstetric care. To make the work easier, we divided patients into two large groups based on the main reasons that brought them to the ObGyn

office - pregnancy or gynecological problem. These nosological entities imply a different approach in providing care.

In the electronic obstetric record that we have developed, an outpatient record module is provided (Fig. 21).

|                           |             |                     |  |
|---------------------------|-------------|---------------------|--|
| УИИ НА ПАЦИЕНТ            | 878         | ИЛИ ИЛИ ИЛИ         | 234.8  |
| ДАТА                      | 6.2.2023 г. | АНАМНЕЗА            | ПРИ ВЪТ МЛЖ фамилен анамнез                                |
| НОМЕР                     | 1           | АНАМНЕЗА            | пупуко ет код; общо състояние; акушерски статус; гинеколог |
| НОМЕР НА ЛС               | 12042       | ОБЕКТИВНО СЪСТОЯНИЕ | интервенция ВРД, ЛС, АС, ГЛ, ЛА, РЛ                        |
| УИИ НА ЛЕКЪЛ              | 12021       | ИСТИН/БАНАНА        | магистер: 2x500, цитология x1, мочо-пик 2x1                |
| КАРАКТЕРИСТИКИ НА ПЕРИОДА | Вторичен    | НАЧАЛИ              |  |
|                           | Доказан     |                     |  |

**Figure 21. Module "Ambulatory list"**

It is based on the form set out in Annex 3 "Primary Medical Documents". It is suitable for working with pregnant women as well as patients with gynaecological complaints. It contains the same fields, but there are no restrictions on the amount of information to be filled in. This allows for a more complete and accurate transmission of the history collected.

The information required by the Maternal Health Programme, additional data concerning the pregnancy, the findings found during the examination, information on the different types of examinations - laboratory tests ordered and recommended, ultrasound examinations performed; the advice given and the therapy prescribed is provided.

Due to the flexibility of the chosen application for the creation of the electronic record, a new, unique column can be added if necessary and/or desired by the team member - joint consultations conducted. In this way, information from other examinations relevant to pregnancy follow-up can be added. What is special about the current demo version of the EOR are the hyperlinks built



between the Outpatient Sheet module and the Obstetric Record module. Their role is key in reducing the time for the administration of the treatment process, since thanks to these links the information once filled in is automatically transferred to the similar fields of the documentation provided for health care professionals. This enables rapid data transfer and allows more time to be spent communicating and providing real patient care. The information offered in the electronic obstetric record includes *a full range of data from a pregnant woman's examination and from a gynecological examination.*

**VOLUME OF DATA FROM AN EXAMINATION OF A PREGNANT PATIENT**

|                            |  |
|----------------------------|--|
| Date and time:             |  |
| Document number            |  |
| ID of medical institution: |  |
| ID of doctor               |  |
| Type of overview:          | Primary/secondary<br>Outpatient/home care  |
| Diagnosis:                 | Z34.8  |
| Anamnesis:                 | Menstrual date: _ . _ . _ . _ . _ . _ . _ . _ .<br>Probable date of birth: _ . _ . _ . _ . _ . _ . _ . _ .<br>Date of embryotransfer: _ . _ . _ . _ . _ . _ . _ . _ .<br>Menstrual cycle: menarche: _ _<br>Aurations : _ _<br>Periodicity: _ _<br>specifics:<br>Family medical history:<br>Comorbidities:<br>Past illnesses:<br>Infectious diseases:<br>Operations:<br>Allergies:<br>Pregnancy order:<br>Pregnancy type:<br>Course of previous pregnancies:<br>Features of previous births:<br>Number of abortions:<br>Type of abortion: |

|                      |   |
|----------------------|---|
|                      | Professional risks:<br>Bad habits:<br>Pets:<br>Hospitalizations since early pregnancy:<br>Medications taken:<br>Complaints:   |
| Objective condition: | <i>General Condition:</i><br>Skin:<br>Slime:<br>Pulmo et cor:<br><i>Obstetric status:</i><br>Weight:<br>Growth:<br>Blood pressure:<br>Circumference of abdomen:<br>Height of Fundus Uteri:<br>State of uterus:<br>Presence of edema:<br>FHB:<br><i>Gynecological status:</i><br>Genital organs:<br>Vagina:<br>PVCU:<br>OECC:<br>Uterus:<br>Ovaries: |
| Research:            | <i>Designated:</i><br><i>Recommendations</i><br><i>Ultrasound examination:</i><br>CRL BDP HC AC FL<br>Placenta:<br>Amniotic fluid:<br>Dopler:   |
| Therapy:             | Medicines:<br>Tips:   |

The outpatient sheet generated by the module of the same name is convenient for handling gynecological patients with acute and chronic diseases.

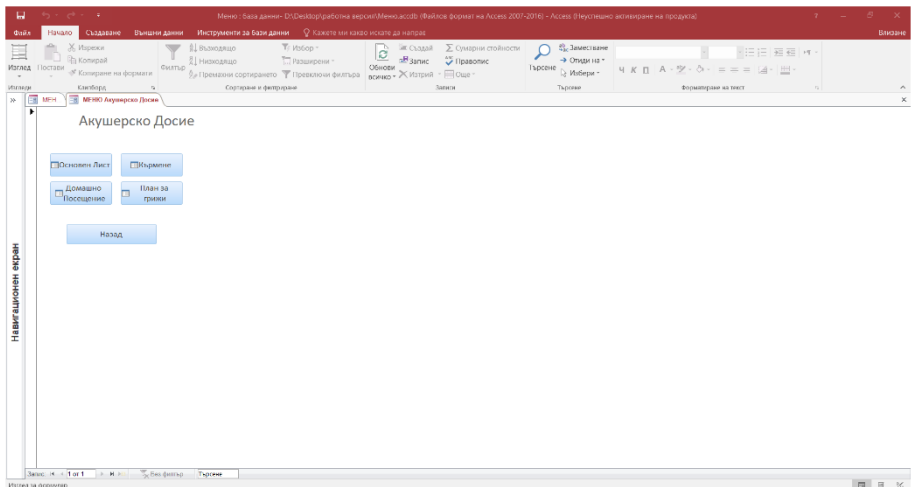
Thanks to the adaptability of the sizes of the individual fields, the necessary information is clearly structured and easy to view. Hyperlinks to the Obstetric Record module enable a quick and easy care plan. Return to the main view via the "Back" button.

***GYNECOLOGICAL EXAMINATION DATA VOLUME***

|                            |   |
|----------------------------|---|
| Date and time:             |   |
| Document number            |   |
| ID of medical institution: |   |
| ID of doctor:              |   |
| Type of overview:          | Primary/secondary<br>Outpatient/home care   |
| Diagnosis:                 | N76.0   |
| Anamnesis:                 | Menstrual date: _ _ . _ _ . _ _ _ _<br>Menstrual cycle: menarche: _ _<br>Aurations : _ _<br>Periodicity: _ _<br>specifics:<br>Family medical history:<br>Comorbidities:<br>Past illnesses:<br>Infectious diseases:<br>Operations:<br>Complaints:<br>In chronic conditions:<br>Timeliness of complaints:<br>Action taken:<br>Consultations held: |
| Objective condition:       | <i>General Condition:</i><br>Skin:<br>Slime:<br>Pulmo et cor:<br><i>Gynecological status:</i><br>Genital organs:<br>Vagina:<br>PVCU:<br>OECC:<br>Uterus:  |

|           |   |
|-----------|---|
|           | Ovary:  |
| Research: | <i>Designated:</i><br><i>Recommendations</i><br><i>Ultrasound examination:</i><br>uterus:<br>left ovary:<br>right ovary:<br>Cavum Douglacy: |
| Therapy:  | Medicines:<br>Tips:   |

The last module that is displayed in the main menu is "**Obstetric record**". It contains four main components - basic sheet, home visit, breastfeeding, care plan. The aim is to cover all the specificities of the different fields in which the midwife of the pre-hospital care realizes her activity. Creating it, was a challenge for us because at this time there is no template for midwifery documentation (Fig. 22).



**Figure 22. Basic view of the obstetric record**

In the development of the vodol, BAHF developments were used, documentation developed, coordinated with a medical law attorney and used

within the independent obstetric practice, WHO checklists and sample documents of various Bulgarian authors. Some of the electronic templates use the principles of creating a midwifery care plan. The issues outlined are closely related to the nursing diagnoses and basic human needs articulated by Virginia Henderson.

The first component of the midwifery care record is the "*Essential Sheet*". It is the primary document that is completed when dealing with all patients, without regard to the reason for the visit. The Core Sheet is a source of information that allows refinement of the need for additional types of documentation. In creating it, we used the outpatient sheet completed by physicians as a template. Our choice is not random. The aim was to make the work as easy as possible. By having the outpatient sheet filled in by a doctor, some of the information concerning the midwives' activities is automatically transferred to the main sheet. This eliminates the need to "transcribe" the data and allows the health care professional to concentrate on their specific tasks.

The main sheet is divided into four parts. The first part contains information about the patient's name; date of examination; the serial number of the sheet; the number of the health facility and the midwife's PIN. These fields are automatically populated when the master sheet is generated. This avoids wasting time manually filling them in and avoids purely technical errors such as incorrectly entered PIN or duplicate numbers.

We have also based the second part on the ambulatory sheet. A field has been created for obstetric diagnosis, medical history, obstetric status and recommendations. It is important to note that it does not matter in what order the physician and midwife documentation will be completed. The medical history information is automatically generated from one document to the other, but each health professional has the ability to correct and/or add to it.

The proposed solution is based on our experience related to patient counseling. Often women accept midwives as their confidants and are much more willing to share and detail their concerns. In this way, a more complete picture of the patient's condition can be built through the simultaneous coherence and independence of the individual documents. The same applies to obstetric status, the downloading of which is embedded in the Maternal Health Programme.

In our opinion, the obstetric diagnosis and the recommendations given are important in the implementation of activities and care. This prompted us to generate them in two separate fields - obstetric diagnosis and recommendations. Although they are visually placed in the upper right corner, it is recommended to complete them after specifying the general status and determining the purpose of the visit /located in the third and fourth part of the main sheet/.

The third part is related to the general status of the patient. The general status is extremely important because it is the basis on which the obstetric diagnosis is made and the necessary care is planned. It is based on the fourteen human needs defined by Virginia Henderson. The general status is placed in a separate table that contains the name of the need, a field to note the corresponding dependency and a field to describe its extent. Due to the large volume of information, a field is provided in this table for performing a search by a specific criteria. The aim is to make it easier to plan care and concentrate it around the key need. It is important to note another feature of this field.

In the process of working on the interface, we preferred users to have a view of all parts of the main sheet at the same time. This necessitated presenting certain elements of the individual tables in list form. In terms of overall status, the needs are presented in the above list form, and movement is done by moving the cursor up and down or by moving in the same directions on the help line located on the left. Working with this item, midwives should identify patients as dependent or not with respect to the following indicators:

- *Breathing: deep/superficial, rhythmic/rhythmic; noisy/free/labored; presence of shortness of breath: yes/no; use of inhaler: yes/no; need for oxygen: yes ..... l/min; / no ; cough: yes/no; sputum: serous/ purulent / bloody / foamy / no; need for specific position to facilitate breathing: yes..... / no*
- *Cardiovascular system and haemodynamics: pulse: frequency, rhythmicity, shape, fullness, tension, size, deficit; arterial pressure; oedema: /presence and localisation/.*
- *nutrition: ability to eat and drink independently; presence of teeth /dentures/; diet; food preferences - appetite: unchanged, decreased, absent, increased;*

- *fluid intake: thirst; fluid intake: sufficient/ restricted/ excessive; swallowing: normal/ difficult; tongue: clean/ coated/dry/ moist; vomiting: gagging: regurgitation: specific breath;*
- *micturition: urination: free/difficult/painful/burning/frequency; urine color: transparency: odor: presence of catheter: diuresis: incontinence;*
- *defecation: stools: formed/constipated/diarrhea; color: regularity of bowel movements: quantity: abdomen: soft/tight/painful/swollen/ presence of colostoma/ileostoma*
- *maintenance of body temperature: chills: temperature:*
- *motor activity: dependence: complete/partial/independent; ambulation: human-assisted/assisted/independent;*
- *personal hygiene: ability to: dress and undress; maintain personal hygiene; self-care; skin: normal/dry/moist; skin blemishes: rash/scars/chippings/bruises; skin turgor: reduced/normal; mucous membranes: normal colour/hyperaemia/pallor/cyanosis/icter*
- *safety maintenance: sleep: normal/impaired; work capacity: preserved/impaired*
- *neuropsychiatric state: consciousness:*
- *clear/confusion/absent; pupils: normal/narrow/dilated; reaction to light: preserved/absent; vertigo: yes/no; seizures: yes/no; muscle tone normal/increased decreased;*
- *motor/sensory disturbances; orientation to time and place; memory difficulties; behaviour usually calm/agitated/aggressive/violent; risk of trauma:*
- *Pain: presence of pain at present; localization; characteristic; acute/ cutting/ tightening/ burning/pulsating; pain tolerance:response: adequate/inadequate*
- *communication abilities: attitude to illness/condition communication ability willingness to communicate; assistive devices used: hearing aids/glasses/lenses; beliefs and religion; ability to learn*

Although varied and variable depending on the conditions in which it takes place, midwifery activity can be reduced to a few strands. This necessitated the development of *the fourth part of the Basic Sheet* (Fig. 23).

The screenshot shows a software window titled 'АКУШЕРСКО ДОСИЕ'. It features a top ribbon with various tool icons and a left sidebar with a tree view of document sections. The main area contains several data entry fields: 'УИН НА ПАЦИЕНТ: 878', 'АКУШЕРСКА ДИАГНОЗА', 'ДАТА: 23.3.2023 г.', 'АНАМНЕЗА', 'НОМЕР: 1', 'АКУШЕРСКИ СТАТУС', 'НОМЕР НА ЛЗ: 12042', 'УИН НА АКУШЕРКА: 100', and 'ПРЕПОРЪКИ'. Below these is a table titled 'Общ Статус' with columns for 'Избор', 'Име', and 'Описание'. The table lists various clinical observations such as 'Телесна температура', 'Двигателна активност', 'Лична жизнена', 'Поддържане на безопасност', 'Невро-психологично състояние', 'Болка', 'Възможности за комуникация', 'Хранене', 'Прием на течности', 'Движение', and 'Земедвижение'. To the right of the table is a 'ДЕЙНОСТИ' (Activities) panel with a list of tasks and checkboxes, including 'Консултация за бременността', 'Информация за развитието на плода', 'Информация за раждане', 'Изготвяне на план за раждане', 'Обучение за родители', 'Подготовка за осъществяване на грижи в', 'Изготвяне на хранителен режим', 'Изготвяне на двигателен режим', 'Жизнена на бременността', 'Изпълнение на манипулации по лекарски', 'Изследване на жизнени показатели', 'Извършване на кардиотографски записи', and 'Други дейности'.

**Figure 23. Base sheet**

The module specifies the purpose of the visit. Only when the health care professional has taken a detailed history, downloaded the obstetric and general status can the obstetric diagnosis be made /part two of the main sheet/. And when it is already clear, the activities to be carried out during the visit can be easily determined. Since not all outpatient facilities allow midwives to carry out the activities independently, some of the most common ones are listed: *pregnancy counselling; information on fetal development; information on delivery; preparation of a birth plan; education for parents; preparation for newborn care at home; preparation of a diet; preparation of an exercise regimen; pregnancy hygiene; performance of manipulations as prescribed by the doctor; examination of vital signs.*



If necessary, additional ones can be added or redundant ones removed. Navigating through the list is again done by moving the cursor up and down or using the help bar on the left.

Correct notation of activities facilitates the transfer of data to other parts of the midwifery record, allows for an improved midwifery care management process and last but not least can be used as a means of costing midwifery labour. The integration of the EOR into medical software actions is sufficient to support the production of reports on the activities of the practice and/or facility concerned, including the annual statistical reports required by the RHI. The information on the activities performed can be systematized and retrieved according to a given criterion - the medical specialist's PIN. This facilitates the assessment of the individual workload of health care professionals and the volume of care provided to a given patient. The administration process is also facilitated in terms of communication with other units of the medical institution - registry, clinical laboratory, etc. The recording of the activities performed can be linked to the registry module of the main medical software and thus facilitate the accounting of the services provided to the patient.

One of the specific activities of the midwife is to perform antenatal and postnatal care. The purpose of the home visit is to ensure optimal physical health and to detect any abnormalities in a timely manner. During these appointments, midwives perform their promotive and educational functions. Efforts in the patronage activity are aimed at carrying out activities that increase the knowledge and skills of young parents regarding newborn care. The parturient should be counselled on issues related to lactation and contraception. All processes specific to puerperium should be monitored and, last but not least, the risk of developing postpartum depression should be assessed. These activities are very different from those carried out in an outpatient setting, require specific skills and last but not least documentation.

Today, health care professionals are only allowed to carry out home visits if they have a contract with a general practitioner. The period in which they are carried out is up to the sixth month after birth. An outpatient sheet is completed after the appointment.

In creating an electronic record, an attempt was made to create a prototype electronic document that would respond to the needs of midwives,

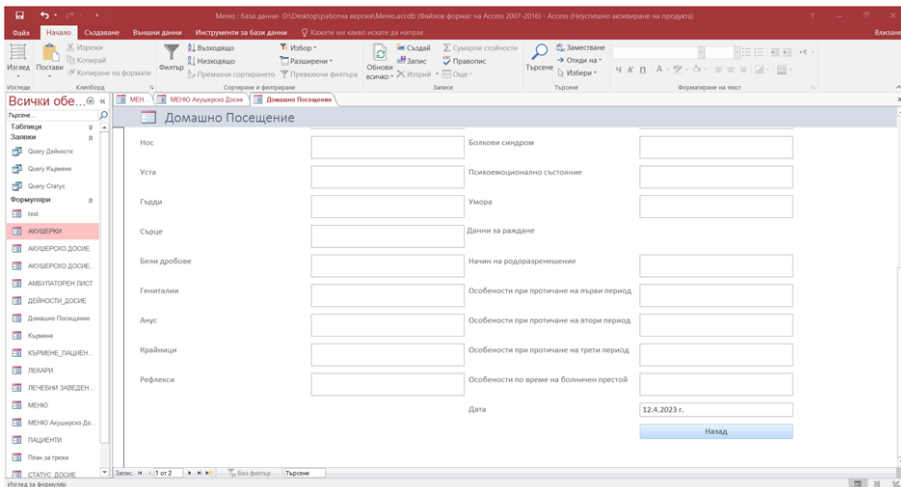
systematize and illustrate the activities performed and the judgments made about the condition of the mother and child.

*The module "Home visit"* contains objectively presented information about the condition of the mother, the baby and anamnestic and documented data about the course of labour and hospital stay. Reference points are provided to guide the midwife in examining her patients. When the visit is of twins an additional sheet can be opened from the electronic record for each baby. In the system the criterion by which the data can subsequently be viewed is the mother's name.

### ***A. Birth data***

Childbirth is a turning point in every woman's life. It affects not only the body, but also the mind of a woman. Depending on the mode of delivery and the course of the hospital stay, the midwife must be ready to detect different types of problems at her first visit. It is imperative that she be informed /preferably from an epicritic/ about the mode of delivery; the particularities of the course of the first, second and third periods; the particularities during the hospital stay.

In the development of the electronic obstetric record, the above information is to be filled in separately. We believe that they are particularly valuable for the correct identification of obstetric problems and diagnoses, respectively the development of a care plan (Fig. 24).



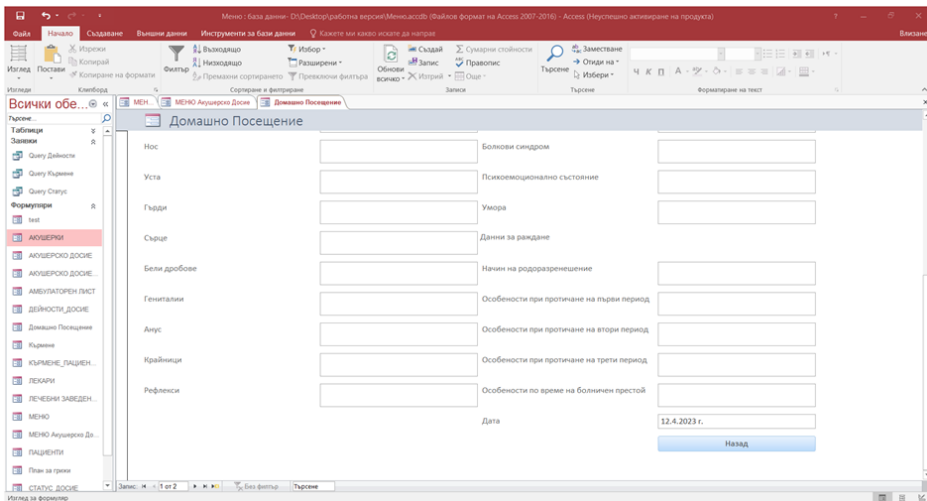
**Figure 24. Module "Home visit" - Obstetric component**

## **B. Maternal examination**

In terms of maternal care, the midwife has a wide range of activities that she can perform independently within a home visit. They can counsel women on breastfeeding issues; educate in lactation maintenance and cessation techniques; conduct trial breastfeeding when necessary; educate parents in newborn care; and provide emotional support.

Numerous studies by national and international authors highlight the key role of the midwife in terms of home-based care.

Assessment of the mother's condition should be carried out carefully, accurately and discreetly after informed consent has been obtained. It includes general condition; breast condition; lochia; perineum; operative wound condition; defecation; urination; pain syndrome; psycho-emotional state; fatigue.

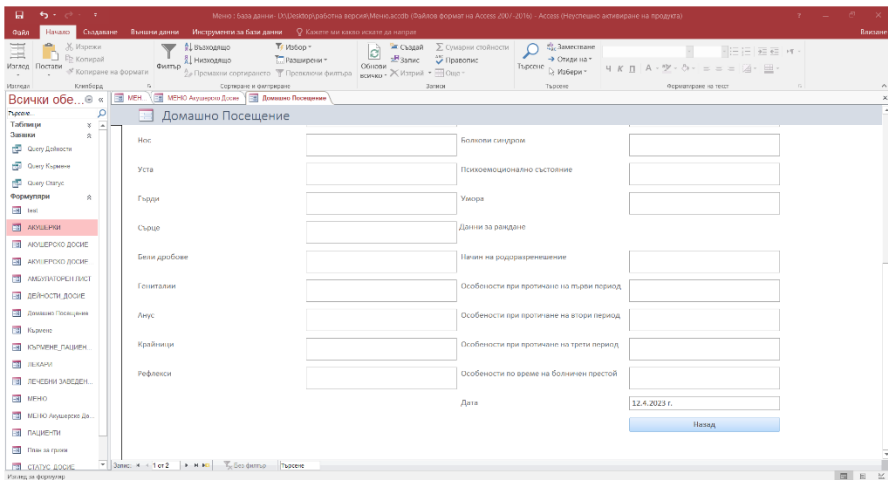


**Figure 25. Module "Home visit" - component Maternal examination**

### **C. Examination of the newborn**

The assessment of the newborn child's condition includes the following independent obstetric activities: *counseling for newborn care, including nutrition, hygiene, immunizations; providing and collecting health information; performing basic toileting; handling umbilical cord residue; assessing health risk factors; and appointing necessary examinations for early diagnosis in newborns with a problem in outpatient care.*

In the course of the home visit, the midwife collects information about the birth, assesses the environment and examines the newborn child, which includes: general appearance; skin; presence of non-infectious and infectious diseases; head; neck; eyes; ears; nose; chest; heart; lungs; abdomen; genitalia; anus; limbs; and reflexes (Fig. 26).



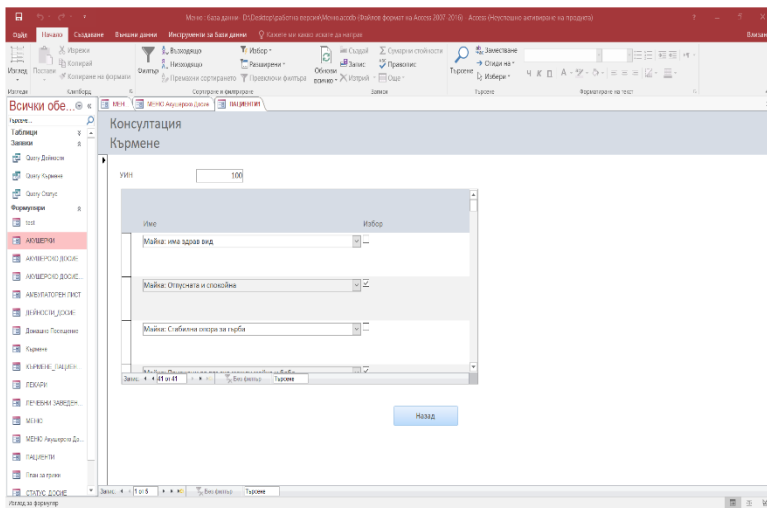
**Figure 26. Module "home visit" - component Newborn examination**

In addition to pregnancy monitoring and birth support, midwives have their place as a reliable source of information on breastfeeding issues. Supporting a woman through the lactation period requires a wealth of knowledge on the subject, excellent analytical, communication and practical skills, and not least empathy. Conducting a lactation consultation is a challenge in itself. It is important not only to determine the nature of the problems, but also to tailor the information and solutions offered to the age and needs of the child and the wishes of the mother.

Because of the diversity of issues and problems requiring breastfeeding counseling, we have created a separate module with the same title. In developing it, we used the following models:

- "Breastfeeding Consultation" checklist posted in the "Diary of a Patron Midwife" by Assoc. D. Dimitrova;
- own notes and materials provided by the organizers of a training course under the WHO Hospitals, Friends of the Baby initiative;
- own notes from a course for lactation consultants;
- own notes from Hospitals, Friends of the Baby courses related to the breastfeeding process.

Breastfeeding counselling can be carried out in both inpatient, outpatient and home settings. In private cases, it can also be implemented through online communication tools (Fig. 27).



**Figure 27. Module "Lactation Consultation"**

In designing the module, we assumed that the encounter would take place in the outpatient setting or in the home of the parturient, as in these situations, the midwife can unleash her full potential to gather and analyze information regarding breast status, use of assistive devices, and breastfeeding technique used. If necessary, health care professionals can also assess the amount of breast milk. This type of counselling takes more time and covers the stages of information gathering, problem identification and training in specific techniques.

The module is also distinguished by its interface. It consists of one centrally located field, which houses multiple drop-down menus. The aim is to reduce the time to complete the documentation accompanying the breastfeeding consultation. The most common sources of problems are preset - the mother's condition and position, the newborn child, the breast, latching and suckling itself. Identification is done by mother's name. Navigating is by moving the cursor up

and down, and returning to the main view is via the Back button. Like all the others, this module allows searching by a given criterion.

In relation to the assessment of the mother's condition, four indicators of problems are indicated - general condition, psycho-emotional state, support and commitment. These are directive in nature and the midwife can give a positive assessment or identify the presence of a problem.

Similar to the maternal section, the newborn section also contains indicators (three in number) with a possible positive assessment or identification of a problem - general state, position and commitment.

During the examination and assessment of the parturient's condition, she was assessed on the following indicators - *presence of surgical interventions in the chest area; placement of breast implants; how much time had elapsed since delivery; when she first placed the baby on the breast; when the baby was last placed on the breast; how much time had elapsed since the last breast emptying; and whether assistive devices were used.*

Obtaining correct information on these questions will enable the midwife to correctly assess positively or register a problem on the indicators provided in the breast section of the breastfeeding consultation module. If the patient has had previous appointments with the team, some of this information will be available in the electronic record and will save the midwife time.

During breastfeeding, often the mother's and/or baby's positions can be the source of a number of problems that escalate and be the reason for early termination of breastfeeding. When the consultation takes place in an outpatient setting, it is essential that the midwife collects as much information as possible about the position the mother occupies when breastfeeding at home. For this reason, implementing a consultation in the woman's home is much more valuable and allows better work on clearing up mistakes made. The electronic record allows information to be supplemented from various electronic devices and gives a comfort similar to that in the office when the midwife completes the documentation at home (Tables 9, 10 and 11).

***Table 9. Specific indicators from the mammary glands for breastfeeding-related problems***

| <b>Indicator</b>    | <b>Positive evaluation</b>               | <b>Presence of a problem</b>                |
|---------------------|--|---|
| <b>General view</b> | Healthy, no visible pathological changes | Availability of ragadi<br>Flushing<br>Edema |
| <b>Disease</b>      | without pain or discomfort               | tense<br>painful                            |
| <b>Technique</b>    | good support by hand                     | incorrect finger grip                       |

*Table 10. Specific indicators of mother-infant relationship for breastfeeding-related problems*

| <b>Indicator</b>            | <b>Positive evaluation</b>                           | <b>Presence of a problem</b>  |
|-----------------------------|--|---|
| <b>Position of the baby</b> | baby's head and body are turned in one direction     | baby's neck and head are curved                                       |
| <b>Distance</b>             | the baby's body is leaning against the mother's body | baby not held close   |
| <b>Stability</b>            | mother sticks baby's whole body                      | mother holds only the baby's head or neck                             |
| <b>Contact</b>              | baby approaches breast, nose points up               | mother brings breast closer to baby nipple points to baby's lower lip |

*Table 11. Specific indicators for twisting*

| <b>Indicator</b>    | <b>Positive evaluation</b>   | <b>Presence of a problem</b>                                       |
|---------------------|--|--|
| <b>Areola</b>       | the visible part of the areola is larger over the baby's upper lip | the visible part of the areola is larger over the baby's lower lip |
| <b>Baby's mouth</b> | wide open  | slightly open  |
| <b>Baby's lips</b>  | the lower lip is turned outwards                                   | lower lip points forward<br>the lower lip faces inwards            |
| <b>Baby's chin</b>  | touches the breast   | don't touches the breast   |



In order to achieve the health goals of a patient, it is necessary to properly assess their needs and specify the problems that health care professionals will work to solve. In the absence of clearly defined rules of operation, one of the challenges of managing care in pre-hospital care is precisely the way in which it will be organised. It is necessary to take into account the increasingly frequent cases requiring a multidisciplinary team of both physicians and health care professionals. As medical institutions are now registered as commercial companies, the pressure to reduce the cost of care provided without affecting the quality of care cannot be underestimated.

In response to this need, we have created the latest module of the electronic obstetric record. It is a digitised image of an *Obstetric Care Plan*. It is presented in tabular form and allows for the illustration of all the problems recorded, the objectives set, the activities implemented, their periodicity and the results achieved (Fig. 28). Patients are identified by their name. Like all the other modules, this one allows searching by a given criterion. The return to the main menu is via the "Back" button.

The screenshot displays a software window titled 'Меню - база данни: D:\Обстetricрна архива\Меню\Access00 (Тайлов формат) на Windows 2007-2016 - Ново! (Последни актуализации на програмата)'. The window contains a sidebar menu on the left with options like 'Всички обе...', 'ЛЮБЕРНИ', 'АМБУЛАТОРНО ДОСЬЕ', etc. The main area shows a form titled 'ПЛАН ЗА ГРИЖИ' with the following fields:

|              |              |
|--------------|--------------|
| ID           | 1            |
| Дата         | 13.4.2023 г. |
| Проблема     | проблема     |
| Цел          | Цел          |
| Дейности     | Дейности     |
| Периодичност | Периодичност |
| Резултат     | Резултат     |
| УИН Пациент  | 878          |

At the bottom of the form, there is a blue button labeled 'Назад'.

**Figure 66. Care Plan Module**

The form, in our proposed software product, complies with all the recommendations of leading organizations for exclusive breastfeeding up to the

sixth month of birth. The document from the Midwife's Patronage Diary is used as the basis, and is built upon with WHO checklist components.

## V. CONCLUSIONS, PROPOSALS AND CONTRIBUTIONS

### 5.1 Conclusions

The results of the survey provide grounds to draw the following conclusions:

1. A necessity for modern midwifery practice, in the context of the development of digitalization, is the implementation of new approaches in recording, reporting and implementation of activities and care.
2. A positive attitude of medical practitioners, academics and experts, in the field of management, towards the creation and implementation of an electronic obstetric record was found (99%).
3. The majority of the surveyed individuals considered the introduction of an electronic midwifery record to be necessary to replace paper records and build on them with a nursing plan, specific midwifery documentation and a greater volume of data related to the care of pregnant women (90%).
4. An electronic midwifery record enables different types of professionals to access the information collected, thereby improving the quality of care and communication within a multidisciplinary team.
5. The possibility of applying the electronic record as a tool for costing midwifery activities and embedding it in regulatory documents was realized (practicing midwives (60%), academics (58%), experts (80%).
6. The majority of the respondents consider the electronic midwifery record as a tool to promote the public image of midwives and increase public trust (practicing midwives (63%), academic lecturers (65%), experts (60%).
7. The digitisation of midwifery care will enable midwives to reach their full potential, previously limited by the lack of practice-specific documentation.
8. The developed design of the electronic medical record is the basis for the creation of a real application to the current medical software.
9. The guidelines for specific conditions at certain lunar months is manifested will help the activity of midwives practicing in outpatient care.

## **5.2. Recommendations**

### **Recommendations to the Ministry of Health on the legal framework regulating the activities of the midwife&**

- To establish a Medical Standard for Health Care.
- To regulate the documentation concerning the midwife's activity in the follow-up of pregnancy, home visits and care provided to the mother and baby in the postpartum period.
- Build on the Maternal Health Programme to improve the quality of follow-up of pregnant women.

### **Recommendations to the National Health Information System**

- To ensure that health care professionals have access to the information entered on the NHSIS servers.
- To create the capability in NHSIS to input information and content generated by midwives.
- Require the availability of an Electronic Midwifery Record component to approved medical software.
- Require a record of midwife activities for each antenatal consultation conducted.
- Enable data access and sharing by multidisciplinary teams of health care professionals.

### **Recommendations to the Bulgarian Association of Health Care Professionals and Educational Institutions**

- Establish a National Model for nursing documentation including formal care plans.
- To organise courses and/or postgraduate training to improve computer skills and working knowledge for medical software.
- Organise forms to upgrade skills in documenting care and using terminology in nursing diagnosis to improve the quality of care provided and improve documentation.
- Establish a means of periodically informing current health care professionals of changes in the classification and components of nursing diagnoses

## **5.3. Contributions**

Based on the results of our own study, the conclusions drawn and the recommendations made, we take the liberty to note the following elements of contribution:

**theoretical-cognitive:**

- A historical overview of the development of midwifery care internationally and in Bulgaria is presented;
- The evolution of the nursing plan is traced and new classifications and recommendations for nursing diagnosis are presented.
- An analysis of normative documents concerning nursing-specific documentation and the possibility of its introduction in our country is made.
- The foreign experience in the introduction of electronic records is studied and the challenges and most common difficulties are reported.
- Best practices in unifying nursing documentation included in the electronic midwifery record are analyzed.
- The attitudes of outpatient midwives, university lecturers and experts from BAHF structures regarding the introduction of an electronic midwifery record including a nursing care plan are explored.
- A SWOT analysis of the concept of an electronic midwifery record was performed.

**practically applied:**

- Medical software capabilities have been explored to introduce additional software product.
- The software product "Electronic Obstetric Record" was developed to be the basis for the inclusion of a component with the same name to the actual medical software.
- The developed product has the potential to introduce documentation specific to obstetric care.
- Created the possibility to build on the already existing pregnancy follow-up file by including additional data from examinations with other specialists.
- Enabled the formation of multidisciplinary teams of health care professionals to fully care for the woman throughout pregnancy, during labour and after birth.

- Software has been developed as a tool to improve the quality, tracking and management of obstetric care in outpatient settings.
- The electronic midwifery record is an innovative tool for costing the activities and care provided by midwives.
- Guidelines for midwife activity management developed.
- The proposed documentation can be helpful and supportive for professionals in need of mentoring.
- The methodology developed is a justification point in the development of formal midwifery care plans

## **PUBLICATIONS AND PARTICIPATION IN SCIENTIFIC FORUMS RELATED TO THE THESIS**

1. Nenova, I. (2021). A survey of pregnant women's attitudes towards the introduction of an electronic health record. *Third International Conference "Health Care - Contribution to Quality of Life"*, Varna.
2. Nenova, I. (2022). Awareness of pregnant vegetarian women on the need for additional vitamin intake. *Ninth international conference for young scientists - SWB*. Plovdiv.
3. Nenova, I. (2023). Awareness of pregnant women on the use of seat belt", *Fourth International Conference "Health Care - Contribution to Quality of Life"*, Varna.
4. Nenova, I. (2023). Role of the midwife regarding prevention of hypertensive conditions during pregnancy. *XVII national forum of health care specialists and poster section for students*, Shumen.