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RULES AND METHOD OF SUPPORTING THE DECISION-MAKING REGARDING THE POSSIBILITY OF EXTRACORPOREAL FERTILIZATION

Considering the impossibility of applying for the paid services of a lawyer in most medical clinics, the legal correctness of decisions regarding the provision of various medical services can be significantly increased by a decision support system or technology regarding the possibility of providing medical services – at the expense of providing a conclusion on the possibility or impossibility of providing this or that medical service, taking into account civil legal grounds.

The conducted analysis proved that none of the known systems/technologies are intended to support decision-making regarding the possibility of providing the extracorporeal fertilization, taking into account civil legal grounds. Although the use of such cross-disciplinary systems/technologies can significantly increase the correctness of the decision from a legal point of view, protect the doctor and the patient from legal collisions, provide an opportunity for a quick and free check of the presence of all significant conditions from a legal point of view, as well as recommendations for further implementation or non-implementation of extracorporeal fertilization procedures.

The article develops rules and method of supporting the decision-making regarding the possibility of extracorporeal fertilization based on the civil legal grounds, which reflect the peculiarities of decision-making on whether or not to carry out extracorporeal fertilization based on the assessment of the sufficiency of information (compliance with requirements) for such a procedure, ensure adaptation to the specifics of the subject area and is a theoretical basis for the development of a decision-making support system/technology regarding the possibility of providing the extracorporeal fertilization, taking into account civil legal grounds.

The developed rules and method ensure: verification of the agreement for the provision of extracorporeal fertilization services for the fulfillment of all essential conditions for the provision of in vitro fertilization from the point of view of civil legal grounds without the participation of legal experts, which ensures the possibility for medical clinics to comply with the requirements of current civil legislation without paying for the services of hired lawyers; a conclusion on the possibility or impossibility of providing the extracorporeal fertilization from the point of view of the civil legislation of Ukraine.

The direction of the authors' future research is the realization of the subsystem of information technology for medical decision-making support taking into account civil legal grounds in the form of web-oriented software based on the developed method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds.

Keywords: rules of determining the possibility of extracorporeal fertilization considering civil legal grounds, method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds, agreement on the provision of extracorporeal fertilization services.

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ПРАВИЛА ТА МЕТОД ПІДТРИМКИ ПРИЙНЯТТЯ РІШЕНЬ ЩОДО МОЖЛИВОСТІ НАДАННЯ ЕКСТРАКОРПОРАЛЬНОГО ЗАПЛІДНЕННЯ

Враховуючи неможливість звертатись за платними послугами юриста більшістю медичних клінік, значно підвищити юридичну коректність рішень щодо надання різних медичних послуг може система або технологія підтримки прийняття рішень щодо можливості надання медичних послуг – за рахунок надання висновку щодо можливості або неможливості надання тієї чи іншої медичної послуги з врахуванням цивільно-правових підстав.

Проведений аналіз довів, що жодна з відомих систем/технологій не призначена для підтримки прийняття рішень щодо можливості надання екстракорпорального запліднення з врахуванням цивільно-правових підстав. Хоча саме використання таких кросдисциплінарних систем/технологій може суттєво збільшити коректність прийнятого рішення з юридичної точки зору, убезпечити лікаря та пацієнта від юридичних колізій, надати можливість швидкої та безкоштовної перевірки наявності всіх істотних умов з юридичної точки зору, а також рекомендації щодо подальшого виконання чи невиконання процедури екстракорпорального запліднення.

В статті розроблено правила та метод підтримки прийняття рішень щодо можливості екстракорпорального запліднення на основі цивільно-правових підстав, які відображають особливості прийняття рішення щодо проведення або не проведення екстракорпорального запліднення на основі оцінювання достатності інформації (дотримання вимог) для такої процедури, забезпечують адаптацію до особливостей предметної галузі та є теоретичним підґрунтям для розроблення системи/технології підтримки прийняття рішень щодо можливості надання екстракорпорального запліднення з врахуванням цивільно-правових підстав.

Розроблені правила та метод забезпечують: перевірку договору про надання послуги екстракорпорального запліднення на виконуваність всіх істотних умов щодо надання екстракорпорального запліднення з точки зору цивільно-правових підстав без участі фахівців-юристів, що забезпечує можливість медичним клінікам дотримуватись вимог діючого цивільного законодавства без оплати послуг найманих юристів; висновок про можливість або неможливість надання про екстракорпоральне запліднення з точки зору цивільного законодавства України.

Напрямок майбутніх досліджень авторів є реалізація підсистеми інформаційної технології підтримки прийняття медичних рішень з врахуванням цивільно-правових підстав у вигляді веб-орієнтованого програмного забезпечення на основі розробленого методу підтримки прийняття рішень щодо можливості надання екстракорпорального запліднення з врахуванням цивільно-правових підстав.

Ключові слова: правила для визначення можливості надання екстракорпорального запліднення з врахуванням цивільно-правових підстав, метод підтримки прийняття рішень щодо можливості надання екстракорпорального запліднення з врахуванням цивільно-правових підстав, договір про надання екстракорпорального запліднення.

Introduction

Considering the impossibility of applying for the paid services of a lawyer in most medical clinics, the legal correctness of decisions regarding the provision of various medical services can be significantly increased by a decision support system or technology regarding the possibility of providing medical services – at the expense of providing a conclusion on the possibility or impossibility of providing this or that medical service, taking into account civil legal grounds.

The successful implementation of such systems/technologies is critically important for improving the efficiency of the medical industry, as these systems/technologies can protect doctors from potentially incorrect decisions due to taking into account all available information, in particular, legal grounds [1] (because many problems in the medical field have legal roots, and solving the legal needs of patients can have a long-term impact on health [2]), are able to provide doctors with the necessary information related to a particular decision, increase the efficiency of the use of current medical resources, accelerate the integration of Ukrainian medicine into the European medical space [3-5].

Let's conduct a review and analysis of known decision support systems for the medical industry taking into account the requirements of civil law.

In Sweden, a national health information exchange platform [6] has been developed, which enables the exchange of information between different health information systems, which is very important to involve patients in the development and evaluation of eHealth services at all levels and to ensure their needs for interoperability and exchange of information.

In [7] health data model portal was developed with the purpose of improving and accelerating the development of health data models by sharing best practices, more standardized data models with semantic annotations, and better information sharing between information systems.

The paper [8] describes the theory, model and optimal control procedure for improving the results of extracorporeal fertilization treatment for one of the four protocols used in real practice.

A study [9] examined the treatment decision preferences of women undergoing extracorporeal fertilization treatment after a failed extracorporeal fertilization cycle.

The review [10] examines the current state of decision-making in individualized female infertility treatment, before considering future developments that may further aid in individualized treatment decisions, including the use of computer-assisted and artificial therapy methods and decision-making using intelligence.

The conducted analysis proves that none of the known systems/technologies are intended to support decision-making regarding the possibility of providing the extracorporeal fertilization, taking into account civil legal grounds. Although the use of such cross-disciplinary systems/technologies can significantly increase the correctness of the decision from a legal point of view, protect the doctor and the patient from legal collisions, provide an opportunity for a quick and free check of the presence of all significant conditions from a legal point of view, as well as recommendations for further implementation or non-implementation procedures of extracorporeal fertilization [5, 11].

Therefore, an urgent task today is to provide support for medical decision-making (for example, decisions regarding the possibility of extracorporeal fertilization) taking into account civil legal grounds by developing an appropriate system/technology for decision-making support, for which it is first necessary to develop rules and a method of supporting the decision-making regarding the possibility of extracorporeal fertilization.

In order to identify the tasks that such a system/technology should solve and its properties, an analysis of the subject area was carried out - the civil and legal grounds for providing the extracorporeal fertilization were investigated [12, 13], during which the essential conditions for providing the extracorporeal fertilization, which are mandatory, were determined for legal correctness and the possibility of carrying out such a medical procedure.

Rules and method of supporting the decision-making regarding the possibility of extracorporeal fertilization

The main source of information is, in fact, the agreement on the provision of extracorporeal fertilization, which precedes the performance of this medical procedure. Such an agreement needs to be checked for its correctness and possibility of conclusion. The agreement can be signed and the medical service can be provided only if all essential conditions are present and fulfilled. If there are no some mandatory essential conditions, then the agreement is not recommended before signing, and, accordingly, the in vitro fertilization procedure cannot be carried out in order to prevent negative consequences for both the doctor and the patient.

Let's develop *the rules of determining the possibility of extracorporeal fertilization considering civil legal grounds*:

- 1) if the woman who will be given the extracorporeal fertilization procedure is of legal age, then $ecf=ecf+1$;
- 2) if the woman who will be given the extracorporeal fertilization procedure is capable, then $ecf=ecf+1$;
- 3) if the woman who will be given the procedure of extracorporeal fertilization has a therapist's opinion about the state of somatic health and the absence of contraindications for carrying a pregnancy, then $ecf=ecf+1$;
- 4) if the blood group and Rhesus factor have been determined for the woman who will be given the extracorporeal fertilization procedure, then $ecf=ecf+1$;
- 5) if the woman who will be given the extracorporeal fertilization procedure has the results of a recent clinical blood test, then $ecf=ecf+1$;

- 6) if the woman who will be given the extracorporeal fertilization procedure has a recently performed coagulogram, then $ecf=ecf+1$;
- 7) if a woman who will be offered an extracorporeal fertilization procedure has the results of recent blood tests for syphilis, HIV, hepatitis B and C, then $ecf=ecf+1$;
- 8) if a woman who will be offered the extracorporeal fertilization procedure has the results of a recent blood test (IgM, IgG) for toxoplasmosis, chlamydia, cytomegalovirus, and measles' rubella, then $ecf=ecf+1$;
- 9) if the woman who will be given the extracorporeal fertilization procedure has the results of a recent bacterioscopic analysis of secretions from three points (vagina, urethra and cervical canal), then $ecf=ecf+1$;
- 10) if a woman who will be offered the extracorporeal fertilization procedure has the results of a recent cytological examination of smears from the cervix, then $ecf=ecf+1$;
- 11) if the woman who will be given the extracorporeal fertilization procedure has recently undergone a general gynecological examination, then $ecf=ecf+1$;
- 12) if a woman who will be given the extracorporeal fertilization procedure has recently undergone an ultrasound examination of the pelvic organs, then $ecf=ecf+1$;
- 13) if a woman who will undergo extracorporeal fertilization has the results of a recent blood test for anti-Mullerian hormone (AMH), prolactin (PRL), follitropin (FSH), lutropin (LH), progesterone (P), estradiol (E2), then $ecf=ecf+1$;
- 14) if the woman who will be given the procedure of extracorporeal fertilization does not have somatic and mental diseases that are contraindications for carrying a pregnancy and giving birth, then $ecf=ecf+1$;
- 15) if the woman, who will be given the procedure of extracorporeal fertilization, has a length of the body of the uterus of at least 35 mm, then $ecf=ecf+1$;
- 16) if the woman who will be given the extracorporeal fertilization procedure does not have acute inflammatory diseases of any localization at the beginning of the in vitro fertilization program, then $ecf=ecf+1$;
- 17) if the woman who will be given the procedure of extracorporeal fertilization does not have congenital malformations or acquired deformations of the uterine cavity, which make implantation of the embryo(s) and carrying the pregnancy impossible, then $ecf=ecf+1$;
- 18) if the woman who will be given the extracorporeal fertilization procedure does not have benign uterine tumors that deform the uterine cavity and (or) require surgical treatment, then $ecf=ecf+1$;
- 19) if the woman who will be given the extracorporeal fertilization procedure does not have malignant neoplasms of any localization, then $ecf=ecf+1$;
- 20) if the blood group and Rhesus factor have been determined for the man who will become a donor for extracorporeal fertilization, then $ecf=ecf+1$;
- 21) if the man, who will become a donor for extracorporeal fertilization, has the results of recent blood tests for syphilis, HIV, hepatitis B and C, then $ecf=ecf+1$;
- 22) if the man who will become a donor for extracorporeal fertilization has the results of a recent spermogram, then $ecf=ecf+1$;
- 23) if the man who will become a donor for extracorporeal fertilization has the results of a recent fluorography of the lungs, then $ecf=ecf+1$;
- 24) if the married couple who will be provided with the procedure of extracorporeal fertilization really needs such an intervention for medical reasons (are incapable of natural birth of children), that is, there is female infertility (there is one of the diagnoses – the absence of fallopian tubes; obstruction of the fallopian tubes; pronounced adhesion process of the pelvic organs ; follicular growth and ovulation disorders; follicular luteinization syndrome; endometriosis; repeated unsuccessful attempts at intrauterine insemination; repeated unsuccessful attempts to stimulate folliculogenesis; age-related infertility (after 36 years) and premature ovarian failure; infertility untreatable by other methods) and/or male infertility (there is one of the diagnoses – infertility of unknown origin; diseases that require preimplantation genetic diagnosis to rule out the possibility of having a child with a hereditary pathology; obstructive azoospermia; asthenozoospermia; oligozoospermia; oligoasthenoteratozoospermia; erectile dysfunction; anejaculation; retrograde ejaculation; anatomical defects of the penis (hypospadias, epispadias); immunological factors (autoantibodies and sperm agglutination)), then $ecf=ecf+1$;
- 25) if the married couple to whom the extracorporeal fertilization procedure will be provided has given written consent, then $ecf=ecf+1$;
- 26) if the anonymity of the donor will be ensured for the extracorporeal fertilization procedure (if it is not a spouse), then $ecf=ecf+1$;
- 27) if the preservation of medical secrecy will be ensured for the extracorporeal fertilization procedure, then $ecf=ecf+1$.

Method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds consists of the following steps:

1. analysis of the agreement on the provision of extracorporeal fertilization services for the purpose of searching for the essential terms contained in the agreement – by the method of performing a broad search in a direct direction in the set of rules to determine the possibility of extracorporeal fertilization considering civil legal grounds, each rule is checked, according to which ecf counter is calculated;

2. if $ecf=27$, it is concluded that extracorporeal fertilization can be carried out;
3. if $ecf<27$, then a conclusion is formed that extracorporeal fertilization cannot be carried out due to non-compliance with the civil legislation of Ukraine;
4. a numerical assessment of the sufficiency of information for carrying out extracorporeal fertilization (compliance with requirements) is calculated according to the formula: $D_{ecf}=ecf/27$, where ecf – is a counter that shows the number of fulfilled requirements (essential terms in agreement).

The developed rules and method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds reflect the peculiarities of decision-making on conducting or not conducting the extracorporeal fertilization based on an assessment of the sufficiency of information (compliance with requirements) for such a procedure, ensure adaptation to the specifics of the subject field and are a theoretical basis to develop a decision support system/technology regarding the possibility of extracorporeal fertilization.

The example of the use of the method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds

An analysis of several agreements on the provision of extracorporeal fertilization services at one of the private clinics of reproductive medicine (Khmelnyskyi) was performed in order to find the essential conditions and indications contained in the agreements. Using the above developed rules of determining the possibility of extracorporeal fertilization considering civil legal grounds, the ecf counter was calculated, which for the first agreement is equal to 23 (the woman who will be given the in extracorporeal fertilization procedure is not of legal age; the woman who will be given the extracorporeal fertilization procedure does not have a therapist's opinion about the state of somatic health and the absence of contraindications for carrying a pregnancy; a woman who will be provided with the extracorporeal fertilization procedure does not have the results of a recent bacterioscopic analysis of discharge from three points (vagina, urethra, and cervical canal); a woman who will be provided with the extracorporeal fertilization procedure, did not undergo an ultrasound examination of the pelvic organs), for the second agreement is equal to 27, for the third agreement is equal to 27, for the fourth agreement is equal to 27, for the fifth agreement is equal to 25 (the married couple who will be provided with the extracorporeal fertilization procedure does not need such intervention for according to medical indications (are capable of natural birth of children), that is, there is neither female nor male infertility; a woman who will be given the extracorporeal fertilization procedure has acute inflammatory kidney disease now).

Since for the first agreement $ecf\neq 27$ ($ecf<27$), and in the first agreement 4 out of 27 essential conditions obligatory for the agreement are missing (sufficiency of information is 85%), as well as for the fifth agreement $ecf\neq 27$ ($ecf<27$), and the fifth agreement lacks 2 out of 27 essential conditions mandatory for the agreement (sufficiency of information is 93%), then for the first and fifth contracts the conclusion is formed that extracorporeal fertilization cannot be carried out due to non-compliance with the civil legislation of Ukraine.

Since for the second, third and fourth agreements $ecf=27$, and in all these three agreements there are all the necessary 27 essential conditions obligatory for the agreement, the conclusion is formed for the second, third and fourth agreements that extracorporeal fertilization can be carried out.

The developed method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds significantly increases the legal correctness of medical decision-making regarding the possibility of providing the extracorporeal fertilization – at the expense of providing a conclusion on the possibility or impossibility of providing of extracorporeal fertilization from the point of view of the civil legislation of Ukraine, as shown by the described example of the use of the developed method. The direction of the authors' future research is the realization of the subsystem of information technology for medical decision-making support taking into account civil legal grounds in the form of web-oriented software based on the developed method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds.

Conclusions

The conducted analysis proved that none of the known systems/technologies are intended to support decision-making regarding the possibility of providing the extracorporeal fertilization, taking into account civil legal grounds. Although the use of such cross-disciplinary systems/technologies can significantly increase the correctness of the decision from a legal point of view, protect the doctor and the patient from legal collisions, provide an opportunity for a quick and free check of the presence of all significant conditions from a legal point of view, as well as recommendations for further implementation or non-implementation of extracorporeal fertilization procedures.

The article develops rules and method of supporting the decision-making regarding the possibility of extracorporeal fertilization based on the civil legal grounds, which reflect the peculiarities of decision-making on whether or not to carry out extracorporeal fertilization based on the assessment of the sufficiency of information (compliance with requirements) for such a procedure, ensure adaptation to the specifics of the subject area and is a theoretical basis for the development of a decision-making support system/technology regarding the possibility of providing the extracorporeal fertilization, taking into account civil legal grounds.

The developed rules and method ensure: verification of the agreement for the provision of extracorporeal fertilization services for the fulfillment of all essential conditions for the provision of in vitro fertilization from the point of view of civil legal grounds without the participation of legal experts, which ensures the possibility for medical clinics to comply with the requirements of current civil legislation without paying for the services of hired lawyers; a conclusion on the possibility or impossibility of providing the extracorporeal fertilization from the point of view of the civil legislation of Ukraine.

The direction of the authors' future research is the realization of the subsystem of information technology for medical decision-making support taking into account civil legal grounds in the form of web-oriented software based on the developed method of supporting the decision-making regarding the possibility of extracorporeal fertilization taking into account civil legal grounds.

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