International Journal of Health, Economics, and Social Sciences (IJHESS)
Vol. 5, No. 4, October 2023, pp. 543~545
DOI: 10.56338/ijhess.v5i4.4461
Website: https://jurnal.unismuhpalu.ac.id/index.php/IJHESS

Expert System Application for Early Warning Detection of Preeclampsia Risk in the Third Trimester of Pregnancy Using the Forward Chaining Method

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Article Info

Article history:

Received September 21, 2023
Revised October 12, 2023
Accepted October 25, 2023

Keywords:

Pregnancy;
Risk;
Preeclampsia

ABSTRACT

During pregnancy there will be changes in the body both physiologically and psychologically. The body's systems will coordinate with each other to maintain pregnancy and give signals to the body that result in discomfort. The creation of this expert system application program is intended to try out an early warning detection plan for the risk of preeclampsia in pregnancy. The method used by forward chaining in research consists of collecting data and information, processing data and information, designing, implementing, testing and evaluating. Conclusion results from the expert system diagnosis process. By creating and designing this expert system, it is hoped that it can increase pregnant women's knowledge about early warning of the risk of preeclampsia in the third trimester of pregnancy independently, quickly and accurately.

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1. INTRODUCTION

During pregnancy there will be changes in the body both physiologically and psychologically. The body's systems will coordinate with each other to maintain pregnancy and give signals to the body that result in discomfort.

Preeclampsia is one of the causes of maternal and fetal mortality, with a fairly high incidence. Preeclampsia is a disorder of blood vessel or vascular endothelial dysfunction that spreads widely resulting in sudden seizures after 20 weeks of gestation, resulting in decreased organ perfusion and activation of the endothelium which causes hypertension, non-dependent edema, and found proteinuria of 300 mg per 24 hours or 30 mg/dl (+1 on the dipstick) with very fluctuating values when taking urine during (1).

One of the causes of maternal and fetal morbidity and mortality is preeclampsia (PE), which according to WHO, the incidence rate ranges from 0.5% - 38.4%. In developed countries the incidence of preeclampsia ranges from 6 - 7% and eclampsia 0.1 - 0.7%. In Indonesia, the causes of maternal death are still dominated by three main causes, namely bleeding, hypertension in pregnancy and infection. Bleeding reached 30.3%, hypertension in pregnancy reached 27.1% and infection reached 7.3%(2).

Childbirth and Complication Prevention (P4K) as well as providing Basic Neonatal Emergency Obstetric Services facilities at PONED Community Health Centers (at least 4 PONED Community Health Centers in districts/cities), as well as Comprehensive Emergency Neonatal Obstetric Services at PONEK

Hospital (3).

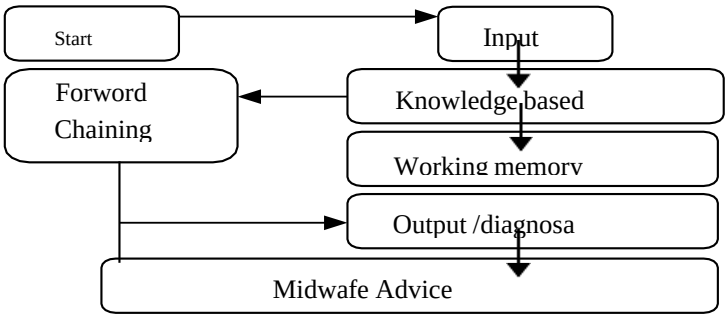
Government policy in overcoming problems related to obstetrics is regulated in the Republic of Indonesia Minister of Health Decree Number 369/MENKES/SK/III/2007 concerning Midwifery Service Standards (SPK) in accordance with standard 3, namely Midwives provide high quality antenatal care to optimize health during pregnancy which includes: early detection , treatment or referral of certain complications (4).

2. METHODOLOGY

The *forward chaining* method is one of the methods in expert systems (5) In previous research, an expert system that used the forward chaining method provided diagnostic results according to the facts entered by the user. In this research, a rule based expert system will be built using the forward chaining method. The use of the forward chaining method in this research is because the expert system application program that was built requires data input from the user and the approach contained in the detection. Early warning of the risk of preeclampsia in pregnancy, in the form of signs and symptoms, perceived changes, where the basis is in the detection. Early warning of the risk. preeclampsia in pregnancy is extracted into the expert system.

3. RESULTS

In this research, the flow of the expert system application that will be created can be seen as follows:



The following is a general description of the system :

1. Input, are questions that arise in the expert system application.
2. Knowledge base (knowledge domain), knowledge regarding the signs and symptoms of contractions which is used as rule-based.
3. Working memory, facts input by the user into the expert system application.
4. Inference Engine, the process of matching facts in working memory with domain knowledge, to draw conclusions.
5. Conclusion results from the expert system diagnosis process.
6. Midwifery care or recommendations according to case intervention.

A. System implementation

Implementation of the system was carried out to build an early warning detection application for the risk of preeclampsia in pregnancy. The application is built on a mobile basis that uses the Android operating system.

B. System testing

Testing is carried out using one test data. The results of the sampling data trial are used to see the system response when receiving input

C. System evaluation

Based on system testing, evaluation is carried out by matching the midwife detection results with the system detection results. to measure the accuracy of the application in detecting early warnings of the risk of preeclampsia in pregnancy

4. DISCUSSION

The development of computer application technology has become increasingly advanced, and has even penetrated almost all aspects of human life. An expert system is a computer program that imitates the thought processes and knowledge of experts to solve a specific problem. Therefore, Expert Systems are built not based on certain algorithms but based on knowledge bases and rules. Artificial intelligence such as expert systems are often used in medical assistance as a complementary solution to finding solutions to medical problems (Obot, 2010). The emergence of artificial intelligence technology in the health sector has spurred

the development of expert system applications for health services, one of which is the detection process "Early warning of the risk of preeclampsia in pregnancy". By combining initial data on the risk of preeclampsia, midwives' knowledge and artificial intelligence, an expert system will be created to detect the early risk of preeclampsia. Expert systems are a field of study in Artificial Intelligence that has been around for several decades. Expert systems can be used to detect health problems by analyzing symptoms (5).

5. CONCLUSION

The creation of this expert system application program is intended to try out a detection plan for early warning of the risk of preeclampsia in pregnancy. By creating and designing this expert system, it is hoped that it can increase pregnant women's knowledge regarding early warning of the risk of preeclampsia in the third trimester of pregnancy independently, quickly and accurately. So you can avoid bad psychological problems and rushing to a health facility.

6. RECOMMENDATION

This research is recommended to all pregnant women, especially third trimester pregnant women who are vulnerable to preeclampsia, which is a significant challenge in the field of obstetrics and women's health.

7. REFERENCES

1. OGILVIE H. Nursing the whole patient. Nurs Mirror Midwives J. 1950;92(2374):5–6.
2. Safruddin, Ely Kurniati, Rusnawati, Risnawati. Prevalence and Risk Factors for Preeclampsia in Pregnant Women in Bulukumba District. J Life Birth. 2020;4(2):63–71.
3. Drobyazko S, Barwinska-Malajowicz A, Slusarczyk B, Chubukova O, Bielialov T. Risk Management in the System of Financial Stability of the Service Enterprise. J Risk Financ Manag. 2020;13(12).
4. Ochab M, Wajs W. Expert system supporting an early prediction of the bronchopulmonary dysplasia. Comput Biol Med. 2016;69:236–44.
5. Yanto BF, Werdiningsih I, Purwanti E. Aplikasi Sistem Pakar Diagnosa Penyakit Pada Anak Bawah Lima Tahun Menggunakan Metode Forward Chaining. J Inf Syst Eng Bus Intell. 2017;3(1):61.