ORIGINAL ARTICLE

Prediction of Reproductive Disorders in Women in Industrial Enterprises Using Digital Technologies

ALENA GENNADIEVNA DERYAEVA[1], VLADIMIR PETROVICH KOSOLAPOV[2], OLGA GENNADIEVNA DERYAEVA[3], GALINA VLADIMIROVNA SYCH[4], ALEXANDER YURIEVICH GONCHAROV[5], ROMAN EVGENIEVICH TOKMACHEV[6]

[1]Assistant of the Department of Public Health, Health Care, Hygiene and Epidemiology, Institute of Postgraduate Education of Voronezh State Medical University named after N.N. Burdenko

[2]Professor, Doctor of Medical Sciences, Head of the Department of Public Health, Health Care, Hygiene and Epidemiology, Institute of Postgraduate Education of Voronezh State Medical University named after N.N. Burdenko

[3]Ph.D., Associate Professor of the Department of Faculty Surgery of Voronezh State Medical University named after N.N. Burdenko

[4]Candidate of Science Associate Professor of the Department of Public Health, Health Care, Hygiene and Epidemiology, Institute of Postgraduate Education of Voronezh State Medical University named after N.N. Burdenko

[5]Doctor of Economics, Associate Professor of the Department of Public Health, Health Care, Hygiene and Epidemiology of the Institute of Higher Education of Voronezh State Medical University named after N.N. Burdenko

[6]Ph.D., Associate Professor of the Department of Faculty Therapy of Voronezh State Medical University named after N.N. Burdenko

Corresponding author: Tokmachev Roman Evgenyevich Address:, Voronezh, Russia, Moskovsky prospect 141, 29. Phone: +7-9003003013. E-mail: r-tokmachev@mail.ru

ABSTRACT

Background: The organization of medical care for workers and employees remains an important form in industrial medicine.

Aim: Creation of software for workers of an industrial enterprise, using the developed models, which will reveal the risk factors for the occurrence of diseases of the reproductive system in women of fertile age and optimize the work of doctors at outpatient appointments with the aim of early prevention of diseases and further observation of the patient.

Methods: To develop the program, 2 groups of 469 women of reproductive age were formed. Using the database, prognostic models were built to identify the likelihood of the development of reproductive system disorders in women, which made it possible to create an algorithm, and later software in order to select optimal medical and social measures.

Results: We have created a computer program to simplify the application of the algorithm in practice.

Conclusion: The developed complex algorithm with an assessment of the informational significance of the parameters will make it possible to predict with high accuracy the development of diseases of the reproductive system in patients of reproductive age. This approach will make it possible to determine the tactics of optimal medical and social measures for managing patients with pathology or the possibility of developing diseases of the reproductive system, to preserve their reproductive health.

MeSH words: Occupational medicine, software, reproductive health, predictive models, prevention.

INTRODUCTION

Medical care for workers at industrial enterprises is developing in accordance with changes in the socio-economic situation in the country and the state of the health care system as a whole. In the context of the introduction of health insurance, occupational medicine should remain as an important form of organizing medical care for workers and employees[1,6].

The aim of the study was to create software for workers of an industrial enterprise, using the developed models, which will identify risk factors for the occurrence of diseases of the reproductive system in women of fertile age and optimize the work of doctors at outpatient appointments with the aim of early prevention of diseases and further observation of the patient.

The tasks were set:

1. To analyze the developed models of the risk of diseases of the reproductive system, which is a sequence of actions focused on the use of methods of mathematical statistics and linear programming.
2. To create software that helps to identify risk factors for the development of this pathology, using the algorithm of the developed models of the occurrence of diseases of the reproductive system in women of fertile age working at an industrial enterprise.

MATERIALS AND METHODS

At the first stage, based on the study of the personal data of women living in the industrial region, an analysis of risk factors for the development of diseases of the reproductive system was carried out. To achieve this goal, 2 groups of 469 women of reproductive age were formed. Among them, 1 group - the main one - women had reproductive dysfunctions and group 2 - control - women of reproductive age without reproductive dysfunctions[2,5]. To solve the problems, an information database was formed with the medical and social characteristics of women with reproductive dysfunction, and prognostic models were developed to take into account the relationship of the medical and social characteristics of women with reproductive health disorders with the state of health[9]. The method of regression analysis was applied in the absence of paired relationships between indicators, which were included as independent variables in the regression equation. In order to achieve the independence of the analyzed medical and social characteristics of women,

based on the results of the analysis of the significance of indicators, a targeted selection of characteristics was made, as a result of which the most significant, statistically unrelated indicators were selected. To achieve this goal, the method of "discrete correlation pleiades" was used[9].

The selected indicators were used to build individual predictive models taking into account that the dependent variable, which characterizes the development of reproductive disorders, can take only two different values - "no impairments" or "impairments", the logistic regression equation was used to build models for predicting the risk of reproductive disorders. The multiple linear regression equation was used to predict the health status of women with reproductive disorders[4,7].

It is possible to predict the likelihood of the development of reproductive system disorders in women living in the industrial region, and their state of health, depending on the identified medical and social risk factors, based on the constructed models[3].

The results of the verification of predictive models have confirmed the effectiveness of the models and provide grounds for recommendations for use in practical health care to simplify the work with predictive models and their use at a doctor's appointment, on the basis of these models, an information subsystem was developed for predicting the development of reproductive disorders in women living in a region with a developed metallurgical industry, which was the basis for creating software in order to select the optimal medical social events.

DISCUSSION

Based on the analysis of the database of women of reproductive age living on the territory of the industrial region, an analysis of the risk factors for the development of diseases of this system was carried out, the information weight of each of the parameters was determined, ensuring the implementation of a mathematical model for predicting the health status of women with reproductive disorders. The developed models made it possible to create an algorithm, and later software for the purpose of choosing the optimal medical and social measures, which has higher diagnostic characteristics than the use of individual mathematical models. A computer program has been created to simplify the application of the algorithm in practice.

RESULTS

As a result of assessing the risk factors for diseases of the reproductive system in women using the methods of mathematical statistics, prognostic models of the occurrence of this pathology were created. The created software using the generated models of the occurrence of diseases of the reproductive system in women working at an industrial enterprise will allow for individual prophylaxis in persons at risk of these diseases, increasing the level of health.

CONCLUSION

Doctors of outpatient clinics will be able to focus their main efforts on promoting a healthy lifestyle, preventing diseases of the reproductive system, individual counseling of women with diseases of the reproductive system. The results obtained will expand the possibilities of a comprehensive examination of women of reproductive age. The developed complex algorithm with an assessment of the informational significance of the parameters will make it possible to predict with high accuracy the development of diseases of the reproductive system in patients of reproductive age. This approach will make it possible to determine the tactics of optimal medical and social measures for managing patients with pathology or the possibility of developing diseases of the reproductive system, to preserve their reproductive health.

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