

HYGENIC ASSESSMENT OF THE WORKING CONDITIONS OF OBSTETRICS AND GYNECOLOGICAL DOCTORS

OCENA HIGIENICZNYCH WARUNKÓW PRACY LEKARZY GINEKOLOGÓW-POŁOŻNIKÓW

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A – przygotowanie projektu badania | study design, **B** – zbieranie danych | data collection, **C** – analiza statystyczna | statistical analysis, **D** – interpretacja danych | interpretation of data, **E** – przygotowanie maszynopisu | manuscript preparation, **F** – opracowanie piśmiennictwa | literature review, **G** – pozyskanie funduszy | sourcing of funding

SUMMARY

Background: Doctors of obstetrics and gynecology perform their professional duties under the influence of different occupational factors. Some of these factors are harmful and a detailed study of their impact on the health of health care workers is required.

Aim of the study: The study was a hygienic assessment of the working conditions of obstetricians and gynecologists, with the aim of identifying possible professional health risks.

Material and methods: The working conditions of 102 obstetricians and gynecologists working in the Grodno region in 2015 were investigated by using the data from their most recent workplace certification and by analyzing the hygienic parameters measured by the laboratory service of the Grodno regional center of hygiene, epidemiology, and public health.

Results: We have described all the occupational factors which were present in the workplaces of obstetricians and gynecologists and have indicated the possible risks posed by these factors to the health of the professionals. We have established that the presence of extragenital pathologies in female obstetricians and gynecologists, arising as a result of contact with harmful occupational factors, contributes to abnormalities in the functioning of the female reproductive system during preparation for pregnancy, and to the development of complications of pregnancy and delivery.

Conclusions: The working conditions of obstetricians and gynecologists may cause deterioration of the health of these professionals. Therefore, the creation and implementation of new preventive technologies for levelling the adverse impact of occupational factors represents an important scientific and practical problem.

KEYWORDS: obstetricians and gynecologists, working conditions, health

STRESZCZENIE

Wstęp: Lekarze ginekologów-położników wykonują obowiązki służbowe, na które mają wpływ czynniki zawodowe o różnym charakterze. Niektóre z tych czynników są szkodliwe dla zdrowia, co wymaga szczegółowej analizy ich oddziaływania na organizmy pracowników służby zdrowia.

Cel pracy: Celem pracy było przeprowadzenie oceny higienicznych warunków pracy lekarzy ginekologów-położników i identyfikacji ewentualnych zagrożeń zawodowych, mających wpływ na pogorszenie ich stanu zdrowia.

Materiał i metody: Warunki zatrudnienia 102 ginekologów-położników, którzy pracowali w obwodzie grodzieńskim w 2015 r., badano wykorzystując wyniki ostatniej certyfikacji pracy i analizując parametry higieniczne, które zostały uzyskane z pierwotnej dokumentacji wyników pomiarów wykonanych przez Laboratorium Regionalne Higieny, Epidemiologii i Zdrowia Publicznego Centrum Grodno.

Wyniki: Opisano wszystkie czynniki zawodowe występujące w pracy lekarzy ginekologów-położników, które mówią o możliwości zagrożenia lub pogorszenia stanu zdrowia w wyniku kontaktu z czynnikami środowiska pracy. Stwierdzono, że obecność pozagenitalnych patologii u kobiet ginekologów-położników w wyniku kontaktu ze szkodliwymi czynnikami zawodowymi przyczynia się do zaburzeń w funkcjonowaniu układu rozrodczego kobiety w czasie przygotowań do ciąży, jak również rozwoju potencjalnych powikłań ciąży i porodu.

Wnioski: Warunki pracy lekarzy ginekologów-położników mogą spowodować pogorszenie ich stanu zdrowia. W tym zakresie tworzenie nowych technologii prewencyjnych na rzecz niwelowania niekorzystnego wpływu czynników zawodowych jest ważnym problemem naukowym i praktycznym.

SŁOWA KLUCZOWE: ginekolog-położnik, warunki pracy, zdrowie

BACKGROUND

According to the World Health Assembly, more half of the world's population works, and this group plays the main role in the economic and social development of society. Workers' health is mainly conditioned by the presence in the workplace of harmful and dangerous occupational factors, and also depends on the efficiency of the protection measures provided by the medical organization.

Currently, about 40,000 doctors work in the health care system of the Republic of Belarus, of whom the vast majority are women of active reproductive age. The multifactorial impact of harmful factors in the workplaces of obstetricians and gynecologists puts them at risk of deterioration in health. The study of the working conditions of this group of medical personnel, and their hygienic assessment, is thus very topical [3].

AIM OF THE STUDY

The aim of this study was to carry out a hygienic assessment of the working conditions of obstetricians and gynecologists, and to identify any professional health risks faced by them.

MATERIAL AND METHODS

We studied the working conditions of 102 obstetricians and gynecologists who provided medical care in outpatient and inpatient conditions at health care organizations in the Grodno region during 2015. Women made up 83.3% of the group and 64.78% of these (55 women) were of reproductive age (23–49 years).

The hygienic assessment of working conditions was carried out by studying the results of the most recent workplace certification; this is the main instrument for receiving objective hygienic assessment about working conditions [6]. We also examined the hygienic parameters obtained from measurements carried out by the laboratory service of the Grodno regional center of hygiene, epidemiology, and public health.

RESULTS

The results show that almost all the workplaces of obstetricians and gynecologists were located in adapted buildings of atypical construction, despite the modernization of the past decade. The offices of this category of doctors, who performed diagnostics and treatment on the premises of health care organizations for outpatients and inpatients, ranged in area from 22 to 47% of the area required by the hygienic standards.

The standards for the permissible ranges of air temperature, relative humidity, and air velocity were complied with in the vast majority of workplaces during the year. Thus, the microclimate parameters in the outpatient and inpatient premises mainly corresponded with the hygienic requirements, and in the final evaluation of working conditions were classified as being 2nd class (permissible) working conditions. The maximum air temperature was $22.3 \pm 0.1^\circ\text{C}$ during the cold period of the year and $26.1 \pm 0.63^\circ\text{C}$ during the warm period of the year. Due to the use of air conditioning systems in the hospital rooms where medical care was provided, the temperature changed only slightly over the year and was $23.1 \pm 0.8^\circ\text{C}$. The relative humidity did not exceed the normative parameters at any of the premises of the specialized health care organizations, being $50.3\% \pm 2.61\%$ in the cold period of the year and $53.4\% \pm 2.57\%$ in the warm period of the year. Air velocity was in the range of 0.16 ± 0.02 m/s in the cold period of year, indicating poor mobility. However, the air velocity was higher than the norm during the warm period of the year in the outpatient premises, reaching 0.47 ± 0.12 m/s on account of natural ventilation (open windows).

The illumination at all the evaluated workplaces was classified as permissible working conditions (class 2). Certain indicators of illumination did not comply with regulatory requirements at certain workplaces; however, the natural and artificial illumination was sufficient at all workplaces in the specialized health care organizations [17].

Bactericidal lighting from quartz lamps was used to disinfect air within the premises of the specialized health care organizations. Rules for their usage in the

workplace complied with the requirements for bactericidal lighting.

Aspects of the location of the specialized health care organizations, their adjacent territories, as well as a significant number of patients in the premises pointed to the need for a detailed study of noise levels in the workplaces of the obstetricians and gynecologists [20]. It was found that the main source of nonintense noise was technological equipment, but that the levels of noise corresponded to the hygienic standards throughout the working day. The impact of noise was rated as permissible (class 2). The level of general and local vibrations arising from the operation of medical equipment was normal according to the hygienic standards. Levels of ionizing and nonionizing radiation, as well as of infrasound and ultrasound, also did not exceed the norms. All these factors were thus classified as class 1 (optimal working conditions).

Occupational factors of a biological nature at the workplaces of obstetricians and gynecologists arise due to the need for constant direct contact with patients' biological material while providing medical care. This class of doctors are thus in a group that experiences a high risk of contracting infectious pathologies, given the conclusion of World Health Organization experts regarding the constant circulation of hospital strains of microorganisms which have high virulence and resistance [7, 22]. The influence of biological factors was determined by the significant bacterial air contamination of the working premises, as reported in the workplace certifications. The highest values of common bacterial contamination were found in the workplaces of those obstetricians and gynecologists who worked in outpatient health care organizations (214.7 ± 12.48 microbial bodies per 1 m^3), while the lowest values were found in delivery rooms: 123.1 ± 7.21 microbial bodies per 1 m^3 in physiological departments and 194.1 ± 14.19 microbial bodies per 1 m^3 in observational departments, which exceeds the established parameters. The effects of such biological factors on obstetricians and gynecologists were rated as class 3.2 (harmful working conditions), given the duration of contact with patients, which was over 65% of working time.

During workplace certification, qualitative analysis of the air aimed at identifying chemical toxicants present at the premises of outpatient and inpatient health care organizations showed that the samples did not contain any chemical substances of concern, except where their concentrations were minimal. The working conditions at all the obstetricians' and gynecologists' workplaces were thus classed as permissible (class 2). Nevertheless, it is known that, during the working day, the concentration of chemical toxicants in the air in the working area typically varies, and may exert an intermittent action on the body, which can be more pronounced than continuous action [13]. Given that the female body is more sensitive to the effects of chemical substances than the male body, changes in the reproductive system can occur without any obvious

signs of poisoning [19]. Hypoxia of tissues develops following contact with chemical toxicants [8], leading to a two-phase reaction in the endocrine system which, while initially aimed at adapting the body to adverse conditions [12], can lead to cytotoxic, mutagenic, and carcinogenic effects among experienced workers aged 30–40 years [19].

The degree of physical effort of obstetricians and gynecologists was classified as category 1b (140–174 W) for those providing the outpatient medical care and 2b (233–290 W) for those providing the inpatient medical care. These high levels of physical effort were associated with the uncomfortable position required during manipulations for diagnosis and treatment, on which obstetricians and gynecologists spend up to 60% of their working time. The time spent in the sitting position, with the main load on the muscles of the neck, shoulders, and hands (as, for example, when filling out medical documents) amounted around 20% of working time. Standing poses with a slight tilt forward and a bend in the spine towards the patient, or with a strong inclination of the body and spine curvature (as during gynecological examinations, during delivery, and when performing operations) made up around 40% of the working time. Obstetricians and gynecologists performed up to 1000 local movements. Furthermore, as shown by the workplace certificates, doctors performed up to 80 tilts of the body while providing medical care and carried out total movements in the vertical and horizontal directions ranging from 2 to 4 km, not exceeding established hygienic norms. Technical breaks did not exceed 5.6% of the total working time and non-professional lost time amounted to no more than 2.5%. In this regard, the severity of the labor process among this group of medical personnel was assessed as permissible (class 2).

We have found that the work process of obstetricians and gynecologists is characterized by high levels of mental tension, mainly due to the considerable intellectual and emotional loads. The occupancy of the working day was very high (around 85.2%), due to the need to perform basic professional operations; this was accompanied by pronounced neuro-emotional tension among the vast majority of doctors. The intellectual and emotional loads were due to the need to solve complex professional problems by choosing appropriate approaches, the significant influence of various kinds of signals on the sense organs, the need to comprehensively evaluate all professional activities, the need to distribute tasks to nurses and to monitor their work, the need to work under time pressure while processing large volumes of information, requiring increased responsibility for the final result of medical care, the high degree of risk to the doctors' own lives, and the large number of patients and information sources that simultaneously require monitoring. In addition, sensory loads played a significant role, including the need for long concentrated observation for up to 68% of the working time and the observation of video terminals

presenting alphanumeric medical information for up to 2.5 hours per working day. Thus, the level of tension was classified as class 3.2 (harmful working conditions).

It should be noted that the regime of work for the vast majority of the doctors was characterized by irregular alternation of the working day, including nighttime, which was also confirmed in the certification of working conditions. This can lead to dysfunction of biorhythms [21] and to the development of burnout syndrome, which the ICD-10-CA (International Statistical Classification of Diseases and Related Health Problems) classifies as a disease associated with the negative influence of the working environment, and which the WHO global action plan for workers' health, 2008–2017, identified as a factor to be prevented [5, 23]. Among obstetricians and gynecologists, the development of different phases of burnout syndrome, with the manifestation of various symptoms, begins to appear in the first years of work among all age groups and specializations [18].

DISCUSSION

The obstetricians and gynecologists at all types of workplace thus work with a complex of occupational factors of various natures, and their working conditions can be characterized as harmful (class 3.3; see Table 1).

Table 1. Summarized results of analysis of obstetricians' and gynecologists' working conditions

Occupational factors	Class of working conditions
Chemical	2 (3.1)*
Biological	3.2
Aerosols with predominantly fibrogenic action	1
Noise	2
Infrasound	1
Ultrasound in the air	1
General vibration	1
Local vibration	1
Nonionizing radiation	1
Ionizing radiation	1
Microclimate	2
Illumination	2
Severity of labor	2
Tension of labor	3.2
Overall degree of harmfulness and hazard of working conditions	3.3

* For obstetricians and gynecologists who work in the operations unit.

Source: Own study.

Our results are compatible with those of other researchers, and show that, under such conditions, obstetricians and gynecologists are unable to avoid disease, even if they follow all the safety rules [4]. These professionals are thus highly at risk of infectious diseases due to contact with occupational factors of a biological nature. Similarly, Selishcheva (2012) has found that respiratory diseases take first place in overall morbidity among doctors of this specialty, and mainly had an infectious etiology [14]. In turn, the presence of extra-genital pathology contributes to abnormalities in the functioning of the female reproductive system during preparation for pregnancy, as well as during pregnancy and delivery [1].

Contact with occupational factors clinically manifests in the form of menstrual irregularities, infertility, neoplasms of the genital organs, complications of pregnancy and delivery with the development of intrauterine fetal hypoxia, threat of pregnancy termination and preeclampsia; these diseases are recorded significantly more often than in doctors of other specialties [11], which allows researchers to consider them as professional pathologies [15].

High levels of primary and general morbidity related to the musculoskeletal system have been recorded among obstetricians and gynecologists, although the conditions of physical effort in such work are relatively favorable [10]. In addition, researchers have found that pathological changes in the female reproductive system under the influence of an increased severity of work can manifest as hypermenorrhea, algomenorrhea, female genital prolapse, cervical erosion, and benign tumors of the genitals [9].

Increased mental tension is accompanied at the onset by a reduction in the nonspecific resistance of the body [11], and is followed by the increasing occurrence of general pathologies of the nervous system and mental disorders, increasing frequency of amenorrhea, risk of miscarriage and spontaneous abortion during pregnancy, discoordination during delivery, and obstetric hemorrhages [2, 16].

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CONCLUSIONS

The working conditions of obstetricians and gynecologists are harmful. Factors of a biological and chemical nature, and the level of mental tension combined with the significant physical effort play a major role in the formation of these working conditions. Performing professional duties under such conditions, especially with increasing workloads, leads to a deterioration in health and the development of common polymorbid pathology, as well as to specific disorders in the functioning of the reproductive system, more severe courses of disease, and more adverse prognoses. Effective preventive measures are thus urgently needed.

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