

EPIDEMIOLOGY OF OCCUPATIONAL DISEASES IN THE REPUBLIC OF TATARSTAN: CHARACTERISTICS, CAUSES AND RISKS

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Abstract: The study is aimed at carrying out an epidemiological analysis of occupational diseases among the population of the Republic of Tatarstan. In this work, the authors analyzed the incidence of occupational pathologies, including work experience with a harmful factor, the age and sex structure of diseases, etiological factors, etc. As a result, it was found that the cases of occupational diseases prevail among men over the studied period (2014 - 72.5%, 2018 - 77%). Imperfections in technological processes are the main circumstance and condition for the occurrence of chronic occupational pathologies (more than 60%) in 2014-2018. It has been established that work experience of 31-40 years in contact with harmful production factors contributes to the development of occupational diseases.

Key words: occupational pathologies (diseases), development risks, risk factors, epidemiology of occupational diseases

1 Introduction

The epidemiology of occupational pathologies is a medical science staying at the intersection of clinical and preventive disciplines (occupational health, occupational diseases, epidemiology of infectious and non-infectious diseases, internal diseases, etc.). This subject can be defined as a multidisciplinary field of medicine, which presents some difficulties, especially when studying the underlying mechanisms of multifactorial health conditions. The application of correct methodology in the field of epidemiology of occupational diseases is of paramount importance from the standpoint of the proper use of statistical and epidemiological methods, such as, for example, stratification and testing of interactions [Mohammad Salehi-Marzizjariani. 2019: Stayner LT, Collins J, Guo Y, et al. 2017: Uetani M, Sakata K, Oishi M, et al. 2011].

There are various programs for the prevention of occupational diseases. Thus, the project "Dig Data in Environmental and Professional Epidemiology" was implemented in Italy from 2017 to 2019. This project included national, regional, and municipal

levels of studying public health risks [S. Fasola, S. Maio, S. Baldacci, C.Gariazzo, P. Michelozzi, F. Forastiere, C. Silibello, M. Stafoggia, G. Viegi].

For example, biomechanical effects at the workplace and exposure to the influence of various factors related to the professional environment can lead to negative effects on health of a working person, which determines the relevance of epidemiological studies of occupational diseases [Svend Erik Mathiassen, Alex Burdorf, Andreas Holtermann and authors. 2015].

Various methods are used in the epidemiological studies of occupational pathologies. Thus, to interpret the results related to physical activity and work involving a sitting position, we can use accelerometry, which, however, is a difficult task. Studies in the field of occupational health show that analysis of exposure variation can be a significant tool in assessing the values obtained [Leon Straker, Amity Campbell, Svend Erik Mathiassen and authors. 2012].

Different jobs, depending on the nature of work, carry a variety of health risks. Thus, some epidemiological studies indicate the fact that the time mode during labor activities involving a sitting position is one of the important determining risk factors for the development of a number of diseases, for example, cardiovascular system diseases and diabetes [Allan Toomingas, Mikael Forsman, Svend Erik Mathiassen and authors. 2012; Allan Toomingas, Désirée Gavhed. 2008; Jannique G Z van Uffelen, Jason Wong, Josephine Y Chau and authors. 2010].

The Republic of Tatarstan is a developed region of the Russian Federation, which presents various activity areas - from the petrochemical industry to office workers, which determined the relevance of this study. The facts described above determined the purpose of this study - an epidemiological analysis of occupational diseases among the population of the Republic of Tatarstan.

2 Methods

The authors of this work analyzed the official data of state reports of the Office of the Federal Service for Supervision of Consumer Rights and Human Well-Being Protection in the Republic of Tatarstan (Office of Rospotrebnadzor in the Republic of Tatarstan) "On the State of Sanitary and Epidemiological Well-Being of the Population of the Republic of Tatarstan" from 2014 to 2018. When processing the results obtained in the course of this study, we used epidemiological methods and generally accepted variation statistics taking into account the reliability degree of results and the compliance of epidemiological studies with the evidence-based medicine criteria.

3 Results

When analyzing occupational diseases in the Republic of Tatarstan for 2014-2018, it was found that men prevail in the structure of these nosologies by gender (more than 70%). Thus, men accounted for 72.5% of all cases of occupational pathologies in 2014, and in 2018 this indicator amounted to 77% (Figure 1).

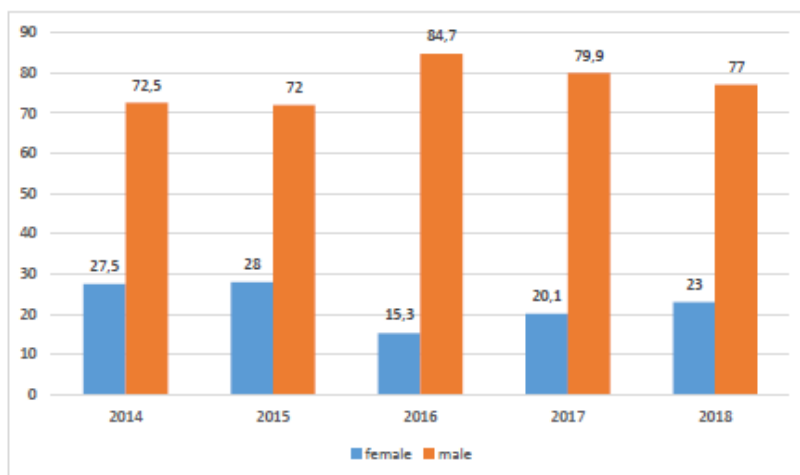


Fig. 1. Gender structure of occupational diseases in the Republic of Tatarstan for 2014-2018, %

During the studied period, the physical factor leads (air temperature, surface temperature, relative air humidity, air velocity, intensity of thermal radiation [Decree of the Chief State Sanitary Doctor of the Russian Federation No. 81 dd. 21.06.2016]) leads the etiological factors of occupational diseases and amount to more than 49%. For 2014-2018, the

occupational diseases related to physical exertion and overwork decreased by 1.2 times and made up 14.9% in 2018 in the general structure of etiological factors. In contrast, the effects of industrial aerosols increased by 1.24 times and amounted to 18.1% in 2018.

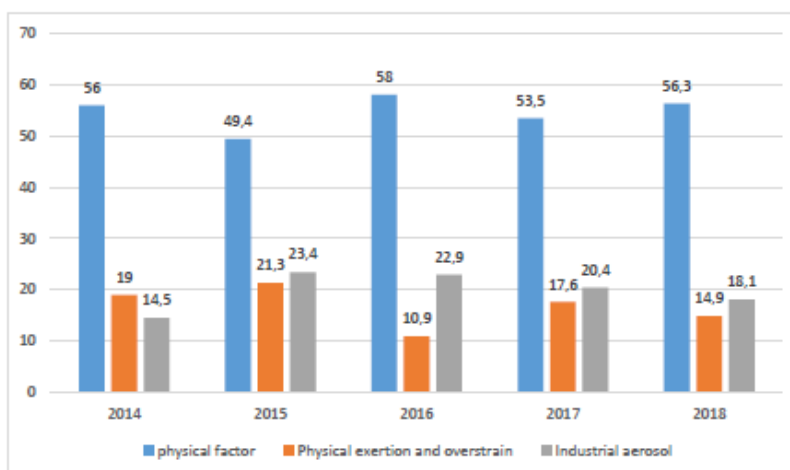


Fig.2. Structure of chronic occupational diseases by etiology in the Republic of Tatarstan for the period 2014-2018, %

Sensorineural hearing loss is the leading pathology in the structure of nosological forms of occupational diseases for 2014-2018 in the Republic of Tatarstan. Thus, the share of this disease in the overall structure of occupational pathologies was 34.8% in 2014, 35.3% - in 2018. Occupational respiratory diseases (2014 - 22.7%, 2018 - 25.6%) are in the second place for the studied

period. The share of vibrational diseases remains at approximately the same level in 2014-2018. The share of musculoskeletal system diseases and peripheral nervous system decreased from 19.4% in 2014 to 14.9% in 2018. The share of other pathologies was 3.3% in 2018 (Figure 3).

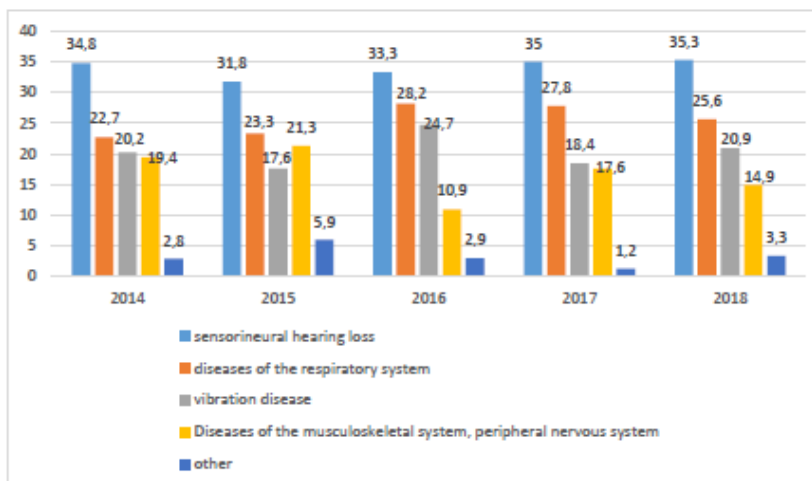


Fig.3. Structure of nosological forms of occupational diseases in the Republic of Tatarstan for 2014-2018, %

The circumstances and conditions of the occurrence of chronic occupational pathologies, the imperfections of technological processes are leading in the studied period. Thus, this indicator increased from 69.8% in 2014 to 81% in 2018. Over the same period, there has been a decrease in the share of structural shortage of machines and technological equipment as the reason

of increase in these nosologies from 17.4% in 2014 to 6% in 2018. However, the structural share of job imperfection increased and amounted to 10% in 2018 against 6.12% in 2014. Imperfection and misuse of personal protective equipment as the circumstances and conditions for the occurrence of chronic occupational diseases amounted to 3% in 2018 (Figure 4).

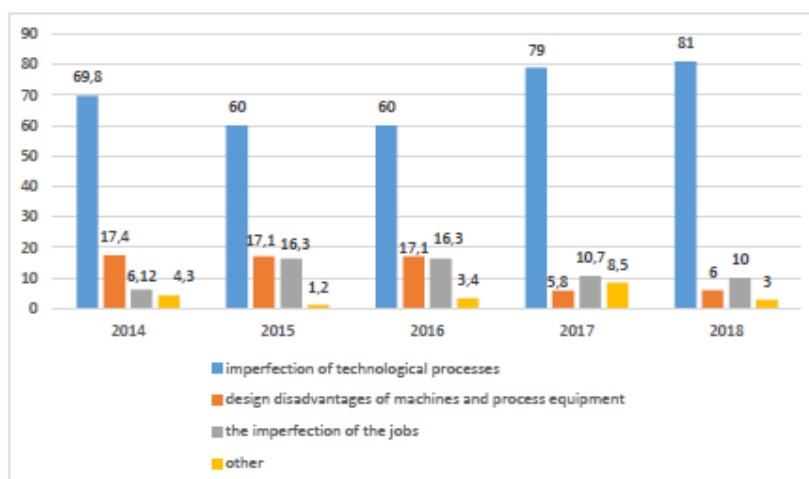


Fig.4. Circumstances and conditions of occurrence of chronic occupational diseases in the Republic of Tatarstan for 2014-2018, %

Analysis of the age structure of cases of occupational pathologies in the Republic of Tatarstan for 2014-2018 revealed that mainly diagnoses prevail in two age cohorts: 21-30 and 31-40 years old. An analysis of the established prevailing age

groups determined an increase in the cohort of 31-40 years old from 38.5% in 2014 to 49% in 2018. In the cohort of 21-30 years old, a decrease in cases of occupational diseases decreased from 37.4% in 2014 to 26% in 2018 (Figure 5).

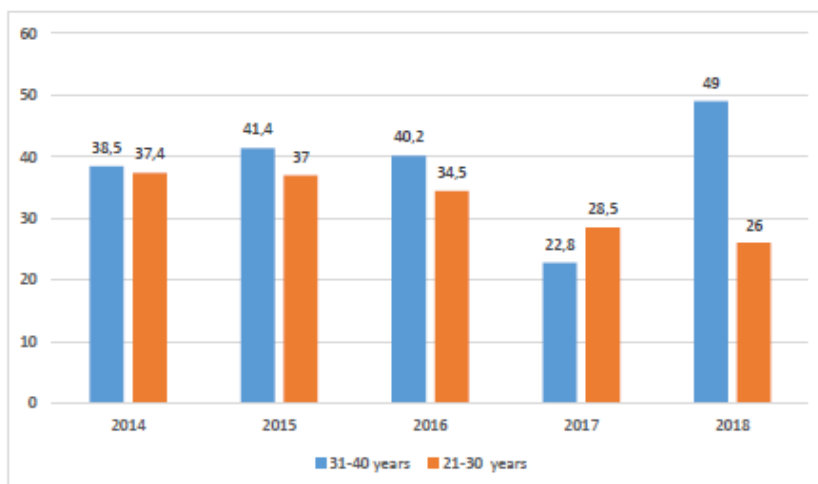


Fig. 5. Structure of the leading age groups among cases of occupational diseases in the Republic of Tatarstan for 2014-2018, %

When analyzing the structure of occupational diseases depending on the length of service in contact with a harmful production factor for 2014-2018, the authors found that the greatest length of service falls on the cohort of 31-40 years old, except for 2017,

where the length of service was 11-20 years (Figure 6). This fact indicates the need to implement recommendations on preventive measures based on the results of special assessment of working conditions.

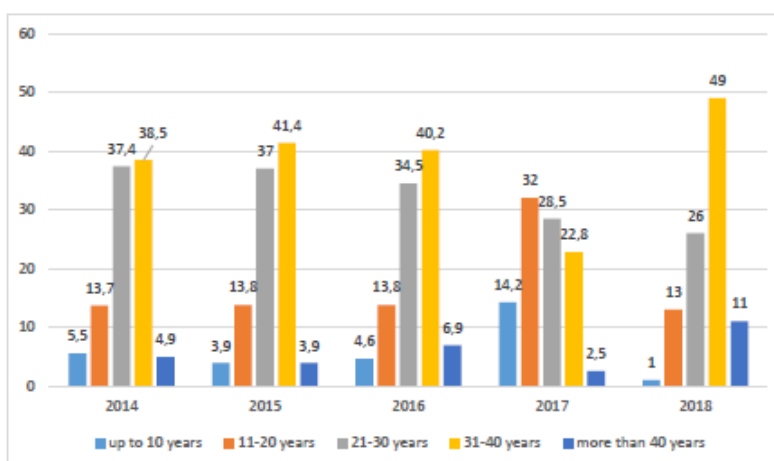


Fig. 6. Structure of occupational diseases depending on work experience in contact with harmful industrial factors in the Republic of Tatarstan for 2014-2018, %

When assessing the incidence of professional pathologies for the studied period, it was found that this indicator decreases in the Republic of Tatarstan, as in the Russian Federation [On the state of sanitary and epidemiological well-being of the population of

the Russian Federation in 2018: State report. – M.: 2019] (Figure 7). It should be noted that this trend is significant in the Russian Federation ($y = -0.148x + 1.912$; $R^2 = 0.9917$).

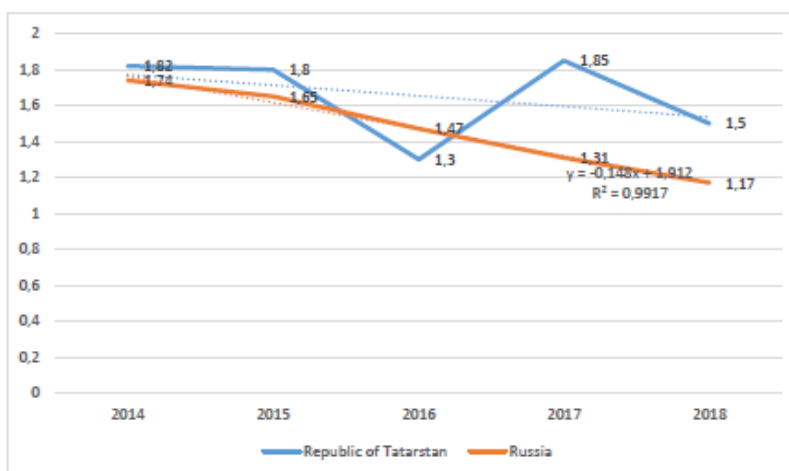


Fig.7. Incidence of occupational diseases in the Russian Federation and the Republic of Tatarstan for 2014-2018, per 100,000 population

4 Summary

According to our study, we can make the following conclusions:

1. Men prevail in the structure of occupational diseases by gender (2014 - 72.5%, 2018 - 77%) in the Republic of Tatarstan for 2014-2018;
2. The physical factor leads in etiology in the region for the studied period (2014 - 56%, 2018 - 56.3%);
3. Sensorineural hearing loss prevails in the structure of professional pathologies (2014 - 34.8%; 2018 - 35.3%);
4. The imperfection of technological processes is the leading condition for the occurrence of chronic occupational diseases in the Republic of Tatarstan for the studied period (2014 - 69.8%, 2018 - 81%);
5. The largest indicator falls on the cohort of 31-40 years old (2014 - 38.5%; 2018 - 49%) in the structure of professional pathologies, depending on the length of service in contact with a harmful production factor;
6. The diagnoses of occupational diseases are established mainly in two age cohorts - 21-30 and 31-40 years old - in the Republic of Tatarstan for 2014-2018;
7. There is a decrease in the incidence of occupational pathologies in the Russian Federation and the Republic of Tatarstan (2014 - 1.74 and 2018 - 1.17; 2014 - 1.82 and 2018 - 1.5; per 100 thousand, respectively). This trend is significant ($y = -0.148x + 1.912$; $R^2 = 0.9917$) in the Russian Federation.

Thus, the prevention of occupational diseases remains an urgent area of modern medicine and requires the improvement of preventive programs.

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