International Journal of
Health Systems and Medical Sciences

ISSN: 2833-7433
Volume 2 | No 4 | April -2023

# Some Aspects of the Development of Osteochondrosis of the Spine

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**Abstract:** This paper presents an analysis of data on the spread ofthe disease in different countries and studies on the factors that influence the development of osteochondrosis of the spine among the population. Data from a literature analysis of social hygienic and biomedical factors of osteochondrosis will be presented. Primary and secondary prevention of osteochondrosis should be optimized, taking into account social health and biomedical risk factors. This will improve medical care and at the same time increase the activity of the population.

**Keywords:** osteochondrosis of the spine, degenerative and destructive changes of the spine, prevalence, socio-hygienic factors, biomedical factors.

## Relevance

Osteochondrosis is a multifactorial degenerative disease of the musculoskeletal system, affecting primarily the intervertebral discs and secondarily other parts of the spine, musculoskeletal system, and nervous system [15]. Due to demographic changes and an increase in the average age of the population, the frequency of degenerative-atrophic changes of the intervertebral discs is increasing exponentially. The frequency of degenerative-dystrophic spinal changes, especially affecting active social populations, ranges from 20% to 80% of cases of temporary disability [8].

According to the World Health Organization (WHO), "spinal osteochondrosis is the leading disease of the musculoskeletal system in the world, to which almost 80% of the world's population is predisposed or suffers, and which accounts for almost 90% of all chronic diseases of this class" [5,32,33]. Osteochondrosis syndrome of the spine among degenerative dystrophic diseases of the musculoskeletal system occupies a leading position [21,34].

The term "osteochondrosis of the intervertebral disc" was introduced by A. Hildebrandt (1933-1935), denoting involutional changes in the form of a cascade degenerative-dystrophic process, which is based on degeneration of the disc with subsequent involvement in the process of neighboring vertebrae, joints, and ligaments of the spine [9,18,24,25].

In parallel with other pathological studies, studies by orthopedic and neurosurgeons appeared, seeking the etiology of low back pain in spinal abnormalities, join tandligament pathology, and herniated discs, and the terms "intervertebral osteochondrosis", "myositis", "fibrositis", "tendonitis", and "myofascial syndrome" began to appear [9].

The result was the emergence of the term "osteochondrosis of the spine", understood as an independent nosology, a genetically determined multifactorial disease of a degenerative nature, affecting mainly the intervertebral disc, secondary structures of the vertebral-motor segment (PDS), musculoskeletal system and nervous system, characterized by polymorphic neurological syndromes

and chronic recurrent course, with a tendency to increase in young and adults, to rehabilitation in the elderly and to clinical recovery in old age [4,9,19,22,26].

Back pain syndrome is considered by foreign and Russian authors as a pandemic. Less than 90% of people have experienced lumbar pain at least once. According to the global survey, pain syndrome in the lumbosacral region requiring treatment was detected in 5.7% of the population of France, from 14 to 45% in the USA and the countries of Scandinavia, Asia and Africa, in the countries of the British Commonwealth lumbalgic syndromes occur in 9.8-14%. In Russia, up to 49% of the active population suffer from lumbosacral back pain syndrome [16,30,31]. The greatest frequency occurs in the 3-5-th decade of life [13,28]. By age distribution, the prevalence is higher in women than in men [29,39] and in other studies, women predominated (68.3%) [23]. Disorders of the musculoskeletal system significantly worsen all aspects of the quality of life. For example, more than 40% of people with chronic pain report a decrease in activity and freedom of movement, 13-19% lose their jobs, and 21% develop depression, which is a burden for patients, their families and society as a whole[3,6,7,27].

In addition to the violation of the social, personal and qualitative aspects of patients' lives, the implementation of treatment and rehabilitation programs is also associated with significant financial losses [2,17,24].

There are theories of the occurrence of degenerative changes of the spine such as: involutive, genetic predisposition, mechanical stress, dysfunctional rearrangements, dyscirculatory abnormalities, autoimmune processes and a number of other factors such as ecology, developmental abnormalities, bad habits, phenotype, etc. [12, 20, 38].

There are socio-hygienic and biomedical factors of osteochondrosis, respectively, they can be called exogenous and endogenous risk factors [11].

The socio-hygienic factors include: statodynamic loads that exceed the functional capabilities of a person, such as heavy physical labor, lifting and moving weights; frequent torso bends, jerky and jerky movements; prolonged forced poses, inactivity, sedentary lifestyle or work; repeated stereotypical movements; unfavorable climatic conditions; a combination of factors.

Biomedical (endogenous factors) of osteochondrosis include impaired posture (kyphoscoliosis); overweight; tall stature; congenital anomalies (spinal canal stenosis, "spina bifida", reduction in the size of a half-leg, short leg, etc.); a symptom of bad legs (flat feet, arthrosis, hammer-shaped 1 finger, etc.); pathology of internal organs; weakness of the muscular corset; frequent infections and intoxication; psychogenic factors [11].

Associated factors of degenerative – dystrophic diseases of the spine (DDDS) are also divided into socio-economic, personal-behavioral, quality and accessibility of medical care. In a study conducted among residents of St. Petersburg, all these factors were studied. They studied factors such as (Socio-economic) social status (student, working, unemployed), age, type of work (mental or physical), limited financial capacity to maintain health, limited availability of medicines and preventive measures necessary to maintain and strengthen health. Factors associated with the peculiarities of an individual's behavior and lifestyle (low medical and preventive activity, self-medication, type of work activity, rare medical treatment, etc.). Defects in the provision of medical care (insufficient quality of medical care, lack of dispensary supervision, etc.) [1].

In the majority of the examined patients, work activity is associated with mental work (79.6%) and less often with physical work (20.4%). Among patients engaged mainly in mental labor, spondylogenic pain syndrome was more often complained of by workers in education, medicine or creative professions (27.0%) than by trade and service workers (20.3%) and workers in management, economics and finance (20.3%) ($\chi 2 = 12.2$, $p< 0.001$). Only 30.1% of patients noted that medicines are available to them, and they actively use them for the treatment of DDCS (degenerative dystrophic diseases of the spine) [1]. But other studies, on the contrary, have shown that DDCS and spondylogenic pain syndrome develop more often in people engaged in physical labor [10]. Heavy physical activity is a known risk factor for the development of lumbar degeneration [40,41]. Some

studies say that, in intellectual workers, osteochondrosis of the cervical spine is more common, and in physical workers, osteochondrosis of the lumbar spine is more common. Among patients, osteochondrosis of the lumbar and cervical spine was detected much more often than in its other departments [19]. To study the occupational factors of lumbar degeneration, a quantitative assessment of the impact and a reasonable determination of the result is necessary [36].

The cohort study examined potential risk factors such as gender, age, body mass index (BMI), working hours per day, working months per year, and total working time spent lifting weights. The adjusted index, taking into account gender, age, BMI, total working time spent lifting weights and working time matrix, was 2.08 (risk ratio) (95% CI: 1.06-4.06) for fishermen compared to farmers. They found that lifting weights affects the degeneration of intervertebral discs [35].

Obesity has become pandemic because of environmental factors that contribute to obesity (inexpensive high-calorie foods, technology and community structures that reduce or substitute for physical activity, and inexpensive non-physical entertainment), over emphasis on low-fat intake, and excessive intake of simple carbohydrates and sugar [37]. Overweight, which is part of the group of biomedical factors, is one of the most common factors predisposing to the development of osteochondrosis. At the same time, obese people suffer not only from osteochondrosis, but also from diseases of other joints (mainly the joints of the lower extremities) [14].

A survey of personal behavioral factors, including the need for medication to preventand treat DDCS, found that only 30.5% of patients with spondylogenic pain syndrome knew about medication. The majority of respondents(84.0%) believed that no preventive measures for DDCS were necessary[1]. Based on the results of the regression analysis (regression coefficient - b), examining the quality and accessibility of health care as risk factors, risk factors in this category include: inadequate access to primary health care ($b = 0.18$; $p < 0.01$); poor quality preventive counseling ($b = 0.15$; $p < 0.01$)); fewer appointments for health improvement and recovery procedure sat healthcare facilities during the year ($b = 0.14$; $p < 0.05$); less frequent and irregular patient contact with the attending physician about the illness ($b = 0.14$; $p < 0.05$); and no outpatient follow-up for DDCS ($b = 0.11$; $p < 0.05$) [1].

**Conclusion**

Thus, among degenerative and destructive diseases of the spine, osteochondrosis of the spine is more common in the working age group (3-50years), the prevalence is higher in women, and osteochondrosis of the lumbar and cervical spine is more common in sick people. Most risk factors affecting the development and progression of degenerative-atrophic diseases of the spine are manageable. These are socio-economic, personal,and behavioral factors, aswell as quality and availability of medical care.

Timely treatment and rehabilitation, work facilitation of workers, reduction of musculo skeletals train, and increased medical activity of the population can be optimized for primary and secondary prevention of osteochondrosis.

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