

# Does the smoking-related mortality and morbidity awareness influence on the prevalence of active smoking among medical students?

Czy śmiertelność związana z paleniem i świadomość zachorowalności wpływa na rozpowszechnienie czynnego palenia wśród studentów medycyny?

Katarzyna Kościelna<sup>1</sup>, Ewa Mędoń<sup>1</sup>, Michał Widuch<sup>1</sup>, Wacław Kuczmik<sup>2</sup>

<sup>1</sup>Student Research Circle at the Department of General Surgery, Vascular Surgery, Angiology and Phlebology, Medical University of Silesia, Katowice

<sup>2</sup>Department of General Surgery, Vascular Surgery, Angiology and Phlebology, Medical University of Silesia, Katowice

## Abstract

**Introduction:** Smoking is one of the main risk factors for developing circulatory and pulmonary system diseases. Nicotinism is also a basis for the development of such diseases as atherosclerosis, cancer, asthma, arterial hypertension. Not only being an active smoker affects health, but also passive smoke inhalation does. Despite the commonly available knowledge regarding the smoking consequences, there is still the number of active smokers also among the healthcare providers.

**Materials and methods:** The research was performed on the base of the specially prepared anonymous questionnaire and conducted among the medical students. Answers were taken account of 234 third-year medical students from the Medical University of Silesia in Katowice. The following information was evaluated: the fact of active smoking, previous attempts to give up smoking, motivation to give up smoking, family risk factors, the most common situations which provoke smoking.

**Results:** Among the 3<sup>rd</sup> year medical students, about 47% consider being an active smoker. Among them, 67% is cigarette addict and 33% is an occasional smoker. According to answers, the most common occasions to smoke are respectively: stress-related with exams, meeting and parties with friends, family problems. The major part of smokers are males (74%). Cigarettes type preferences were different in both sexes, so were kinds of smoked substances.

**Conclusions:** Despite the acknowledgement of threat to health, especially in the medical environment, a still big percentage of young people remained active smokers. It seems to emphasize the necessity of making students aware of smoking negative effect on their health.

**Key words:** smoking, health care providers, medical environment, smoking-related morbidity

Chirurgia Polska 2019, 21, 1–2, 15–19

## Introduction

Promoting smoking cessation is the main component of a comprehensive national and international tobacco control programs striving for tobacco use reduction [1, 2]. Encouraging smokers to attempt to quit and offering them help from experts during that process is the quickest and

most effective way to decrease the incidences of diseases related to smoking and mortality resulting from complications caused by long-term addiction. It also allows reducing costs and expenses incurred by health service on hospitalization of patients suffering from smoking-related diseases [3]. World Health Organization estimates over 5 million deaths per year caused by consequences

of habitual smoking of tobacco products [4]. According to statistics, one in five deaths is caused by complications after chronic cigarettes smoking [5]. That addiction is the main risk factor of cardiovascular diseases development — even in people who smoke less than 5 cigarettes a day, it is possible to observe their early symptoms [6]. Smoking is not only an independent risk factor of cardiovascular diseases, but it appears to have numerous more interactions with the other major risk factors for coronary heart disease, including high serum levels of lipids, untreated hypertension, and diabetes mellitus. For example, if the presence of smoking alone doubles the level of risk, the simultaneous presence of another major risk factor will quadruple the general risk [7]. Following this assumption, the presence of two other risk factors with smoking results in approximately eight times the risk compared to people with no risk factors [7]. Cigarette smoking has also a significant influence on peripheral arterial disease, aortic aneurysm, coronary heart disease, and cerebrovascular disease development. The highest relative risks are observed for diseases of peripheral arteries in the lower extremities, and the lowest are for stroke [7].

The fundamental mechanisms by which smoking results in cardiovascular disorders include the development of atherosclerotic changes with narrowing of the vascular lumen and induction of a hypercoagulable state, which can result in acute thrombosis. The rapid decline in risk of a recurrent myocardial infarction after smoking cessation demonstrate the participation of tobacco smoking in developing thrombosis [8]. There is a four times higher risk of coronary heart disease or stroke incidents in the smoker population [9]. Furthermore, smoking can have a negative impact on the therapeutic outcome of treating cardiovascular diseases. It is documented, that smokers with previous acute coronary syndromes like STEMI (ST-elevation myocardial infarction), can reach clinical outcomes similar to those in non-smokers with a higher risk of being a burden of thrombus and lesser non-culprit artery involvement [9]. To the disastrous complications of long-term smoking, we can include primarily respiratory system diseases, what is confirmed by the fact that there almost 90% deaths from lung cancer and 80% deaths from the chronic obstructive pulmonary disease are caused by chronic cigarettes smoking [6]. The risk of lung cancer development in the population of smokers is significantly higher — 25 times higher for males and almost 26 times higher for females [6]. Studies showed also a higher risk of diabetes, which increases 30–40% in active smokers than non-smokers [10].

Smoking leads to endothelial injury and dysfunction in both coronary and peripheral arteries [7]. Cigarette smoke contains oxidizing chemicals and nicotine responsible for endothelial dysfunction. Some of them can extremely affect our health, for example, carbon monoxide (CO) or acrolein [7]. Carbon monoxide exposure can cause ischemia and intensify symptoms in patients with vascular disease. CO binds avidly to haemoglobin, reduces the amount of haemoglobin available to carry oxygen and impedes the release of oxygen by haemoglobin. It is reported that CO

exposure in patients suffering from obstructive coronary disease resulted in a greater degree of exercise-induced ventricular dysfunction and increased the number of ventricular arrhythmias during exercises [7].

Long-term exposure in smoking addicts resulted in a greater red blood cell mass and reduced the capacity of red blood cells to transport the oxygen, which leads to hypoxemia. In response to hypoxemia, red blood cell masses increased to maintain the amount of oxygen needed by cells of the body. The increase in red blood cell mass increased blood viscosity and may contribute to hypercoagulation [11]. Acrolein is a reactive aldehyde produced by endogenous lipid peroxidation, presented at high levels in cigarette smoke [7]. It binds covalently to form protein adducts, and that modification of proteins is crucial for the development of atherogenesis. It also oxidized thioredoxins -1 and -2 in endothelial cells, which results in damage of the oxidation-reduction balance for normal cell function. Oxidation of thioredoxins can result in dysfunction and death of endothelial cells, leading to atherosclerosis [7, 8]. Cigarette smoking results in the development of an atherogenic lipid profile, caused by the increase in triglycerides and a decrease in high-density lipoprotein cholesterol [7]. It leads to the production of insulin resistance and chronic inflammation, which can lead to macro- and microvascular complications, including nephropathy [7]. The chronic inflammatory state promotes the atherogenic disease processes and elevates levels of biomarkers of inflammation, known as predictors of cardiovascular disorders [7].

Statistic data from 2017 inform, that about 26% of European society aged over 15 years old belongs to a group of active smokers of tobacco products. In Poland, that group is represented by 26% of females and 33% of males [12]. In a view of educational attainment level of Polish society, the mentioned percentage is the highest in a group of people with secondary education (27.8%), and lowermost among those with tertiary education completed (12.3%) [13]. A study published in 2010 in Italy revealed, that common cigarettes smoking among medical professions is declared by 44% of respondents, what seems to be twice as the percentage of smokers in the general country population. In medical environment researchers pointed out smoking nurses (48.2%), doctors (33.9%), medical students (35%) and PhD students (52.9%) [14]. Those results are not specific only for Italy, because a high percentage of smokers has also been noticed in Spain, Poland and Germany [14]. Furthermore, actively smoking doctors were willing to declare more important professional priorities than to help patients in smoking cessation, compared to non-smoking doctors (52% vs. 44%;  $p < 0.001$ ) [15].

The goal of the presented research was to evaluate if the smoking-related mortality and morbidity awareness influence on the prevalence of active smoking among the medical students of the Medical University of Silesia in Katowice. It is also an assessment of future medical doctors awareness about health complications caused by long-term cigarettes smoking. Authors also investigated

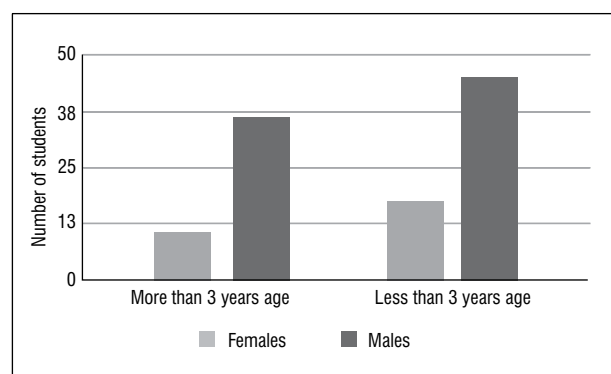


Figure 1. Beginning of smoking addiction among students

how high is the percentage of active smokers who had tried to quit smoking in the past and how many of them had succeeded or not.

## Materials and methods

As the method of collecting data authors used self-constructed anonymous questionnaire composed of 20 questions divided into open and closed. It helped the authors to detect such information about respondents as age, sex, duration of smoking, number of cigarettes smoked per day, preferred tobacco products, and also specific situations or emotions provoking them to reach for a cigarette. The questionnaire also consisted of questions concerning family risk factors being the diseases associated with long-term smoking. After that, the authors placed some questions about respondents will to quit smoking, their effort in cessation and possible success. The study was performed on 234 3<sup>rd</sup> Year Students of the Medical University of Silesia in Katowice including 101 women (43.16%) and 133 men (56.84%). The research was carried out with people who were 22 to 24 years old (median: 22 years old).

## Results

From all the completed questionnaires (234 investigated students) smoking tobacco has been declared by 110 students (47%). In the group of smokers, there are 29 women (26.36%) and 81 men (73.64%). Active smoking is declared by 74 students (67.27% among smokers) and 36 of them (32.73% among smokers) use tobacco products occasionally. Most smokers — 66 people (60%) had started smoking in lower or higher secondary school, while 44 people (40%) started smoking at the medical university (Fig. 1).

A large majority of smokers — 75 individuals (68.18%) smoke averagely 10–20 cigarettes per day. Only 15 stu-

Table I. Quantity of cigarettes smoked per day by students

| Quantity                   | Less than 10 cigarettes/day | 10–20 cigarettes/day | More than 20 cigarettes/day |
|----------------------------|-----------------------------|----------------------|-----------------------------|
| Number of smoking students | 15                          | 75                   | 20                          |
| women                      | 9                           | 15                   | 5                           |
| men                        | 6                           | 60                   | 15                          |

dents (13.64%) smoke less than 10 cigarettes per day, whereas 20 students (18.18%) smoke more than 20 cigarettes per day (Table I).

The greater part of actively smoking students — 76 (69.09%) — smoke non-menthol cigarettes and others — 36 students (30.91%) declare smoking menthol cigarettes. In the families of 67 smoking respondents (60.91% among smokers) appeared actively smoking people. There was also a significantly higher number of diseases in respondent's family, which could potentially be a result of smoking, such as coronary heart disease, hypertension, diabetes mellitus, hypercholesterolemia or stroke episodes (Table II).

More than half of smokers: 59 of 110 people (53.64%) declared occurrence at least one of the diseases mentioned above in family history. Most of the respondents marked hypertension, hypercholesterolemia and coronary heart disease as diseases appearing mainly in their family. On account of great harmfulness and increased risk of systemic diseases caused by habitual smoking, there was also a question in the questionnaire about respondents' attempt at quitting smoking in the past. 47 people (42.73% of smokers) answered that they had an intention of quitting smoking but only 25 people (22.73%) had tried quitting smoking in the past.

## Discussion

As the main problem in the effective fight with addiction to cigarettes smoking, we can define ignorance towards the critical influence of cigarettes smoking on health, insufficient education and its not very effective forms, but also "support" coming from other smokers consisting of disregarding one's own problem when it is observed in others — those are the main aspects which need to be improved. Moreover, young people are the ones who especially ignore possible harmful effects of tobacco smoking developing in older age, because they have not already experienced them.

Research carried out in 2012 on a group of Italian students showed that almost 45% of the study group tried to quit smoking, however, not successfully, and continued on smoking. Another 40% of that group confirmed they do not feel mentally ready to quit [16]. Healthcare

Table II. Diseases occurrence in students' families (data obtained from the family history of 110 smoking students)

|                              | Hypertension | Hypercholesterolemia | Coronary heart disease | Diabetes mellitus | Stroke episodes |
|------------------------------|--------------|----------------------|------------------------|-------------------|-----------------|
| Disease occurrence (%/numer) | 51% (56)     | 51% (56)             | 35% (38)               | 20% (22)          | 6% (7)          |

System offers many possible ways of smoking cessation to help current smokers. Over 80% of smokers are seeing their doctors every year, and most of them expect physicians to help in quitting and declare following their dispositions [17].

A study from Japan showed that 80% of medical students did not consider smoking cessation as necessary, as long as patients did not have smoking-related diseases [18]. In fact, current smokers are already sick. They are affected by nicotine dependence, which the World Health Organization and the American Association of Psychiatry included in the International Classification of Diseases and the Diagnostic and Statistical Manual of Mental Disorders. If addicts wait until they notice symptoms of smoking-related disease before they quit, a huge amount of health damage will already have been done, and they will have lost significant life expectancy [4]. Those results suggest that medical students need to receive special education and professional help in smoking cessation directed to their social group. Convincing a larger amount of students to try to quit is an ethical obligation to act in the best interest of public and patients' health, as the smoking status of physicians can impact their professional practice [16].

Smoking cessation is beneficial among all age groups, however, smokers who had quit in their age between 35–44 have the biggest chance to avoid death caused by post-smoking complications developing during a long period of cigarettes smoking [19]. A study performed in London, England, showed an 18-per cent reduction in mortality from coronary heart disease in the intervention group in comparison to the control group after 10 years of follow-up [20]. It is also reported that smoking cessation reduces morbidity and mortality in patients with left ventricular dysfunction. In another study, the benefits of stopping smoking were comparable to the benefits of treatments with angiotensin-converting-enzyme (ACE) inhibiting drugs,  $\beta$ -blockers, or spironolactone [21]. A study by Woloshin, Schwartz *et al.*, showed how many men per 1000 will die within the next 10 years because of vascular diseases like coronary heart disease or stroke. In particular age categories, men were divided into active smokers and those who had never smoked. In the group of 35-year-old, 7 active smokers per 1000 will die because of coronary heart disease while in the non-smoking group it will be only 1 man per thousand. In the group of 45-year-old respondents, 14 per 1000 active smokers will die because of coronary heart disease and 3 per 1000 because of stroke. Among the non-smoking groups, this relationship looks like: 3 per 1000 non-smokers will die of heart disease and only 1 per 1000 will die of stroke. In the range of 55 years old current smokers, 41 per 1000 deaths will be caused by coronary heart disease and 7 per 1000 by of stroke. Among non-smokers, this ratio is much lower: 19 deaths per 1000 deaths from heart disease and 3 per 1000 caused by stroke. The last age group is 65 years old men. Among active smokers, heart disease will be the reason for the death of 74 men per 1000, and 16 per 1000 on account of stroke. In a non-smoking group in

this age range 52 per 1000 men will die because of heart disease and 9 per 1000 because of stroke. Basing on this data, it is clearly seen that regardless of the age group, higher risk of death concerns active smokers [22].

Not only cardiovascular and respiratory systems are affected by smoking. Toxic compounds of cigarette smoke have a destructive impact on the digestive system as well. It doubles the risk of peptic ulcers development and death from this disease, caused by disturbed cell proliferation, delayed blood vessel formation and decrease of mucus synthesis and secretion [23]. The risk of non-gallstone-related acute pancreatitis incidents is also higher in people who smoke cigarettes daily [24]. Other diseases in a group of higher risk in smokers include paralytic ileus and bowel obstructions, cholelithiasis, diverticulitis, and gastrointestinal haemorrhages [25]. There is reported association between smoking and a higher risk of prostate cancer documented in many studies, which showed that the heaviest smokers had a 24% to 30% greater risk of death from prostate cancer compared to nonsmokers [26].

There are immediate and long-term health benefits of quitting and they should be a huge encouragement for all smokers to take the initiative in smoking cessation. Some beneficial health changes take place immediately — in 20 minutes, heart rate and blood pressure decrease and within 12 hours, the carbon monoxide level in the blood returns to normal. After 2–12 weeks, circulation improves and lung function increases, what makes coughing and shorten breath decrease in 1–9 months. One year after smoking cessation risk of coronary heart disease is half lower than before quitting. Long-term beneficial effects appear in 5 years as a reduced risk of having a stroke or transient ischemic attack. In 10 years after cessation, risk lung cancer development falls to about half of a smoker, so does the risk of having a cancer of throat, oesophagus, bladder, cervix or pancreas. 15 years after, the risk of coronary heart disease is the same as for nonsmokers [27].

People who already suffer from smoking-related health problems can still benefit from quitting. Benefits in comparison with those who continued smoking concern length of life expectancy. People who quit at about 30 years old gain almost 10 years of life expectancy. Those who quit in their forties gain 9 years. For 50-year-olds gained life expectancy is about 6 years [28].

Despite the knowledge available to society about the harmful effects of smoking on health, especially in the medical environment, the overwhelming percentage of young people remain active smokers. It emphasizes the necessity of exerting more pressure on informing the academic society of medical students, and at the same time, it shows the inefficiency of common methods of smoking cessation. This study shows that among the group of medical students, the number of male smokers prevails. The majority of students, who smoke are addicted to smoking. They usually had started smoking during studies and smoke about 10–20 cigarettes a day. It can be observed that people who have active smokers in their closest family are more likely to smoke. Also,

the presence of cardiovascular diseases, being the most probable consequence of this addiction, does not reduce their willingness to reach for a cigarette and does not motivate them to quit smoking.

## References

- Centers for Disease Control and Prevention. Best Practices for Comprehensive Tobacco Control Programs—2007. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2007.
- U.S. Department of Health and Human Services. Reducing Tobacco Use: A Report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.
- Institute of Medicine. Ending the Tobacco Problem: A Blueprint for the Nation. Washington: The National Academies Press, 2007.
- Cattaruzza MS, West R. Why do doctors and medical students smoke when they must know how harmful it is? *Eur J Public Health*. 2013; 23(2): 188–189, doi: [10.1093/eurpub/ckt001](https://doi.org/10.1093/eurpub/ckt001), indexed in Pubmed: [23334819](https://pubmed.ncbi.nlm.nih.gov/23334819/).
- Centers for Disease Control and Prevention. QuickStats: Number of Deaths from 10 Leading Causes—National Vital Statistics System, United States, 2010. *Morbidity and Mortality Weekly Report*. 2013; 62: 155.
- The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.
- How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General. *PsycEXTRA Dataset*. 2010, doi: [10.1037/e590462011-001](https://doi.org/10.1037/e590462011-001).
- US Department of Health and Human Services. The Health Benefits of Smoking Cessation A Report of the Surgeon General. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1990. DHHS Publication No. (CDC): 90–8416.
- Gupta A, Verma SK, Sharma R, et al. Clinical and angiographic profiles and six months outcomes of smokers with acute ST segment elevation myocardial infarction undergoing primary percutaneous coronary angioplasty. *Indian Heart J*. 2018; 70(5): 680–684, doi: [10.1016/j.ihj.2018.02.006](https://doi.org/10.1016/j.ihj.2018.02.006), indexed in Pubmed: [30392506](https://pubmed.ncbi.nlm.nih.gov/30392506/).
- U.S. Department of Health and Human Services. How Tobacco Smoke Causes Disease: What It Means to You. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2010.
- Benowitz NL. Cigarette smoking and cardiovascular disease: pathophysiology and implications for treatment. *Prog Cardiovasc Dis*. 2003; 46(1): 91–111, doi: [10.1016/s0033-0620\(03\)00087-2](https://doi.org/10.1016/s0033-0620(03)00087-2), indexed in Pubmed: [12920702](https://pubmed.ncbi.nlm.nih.gov/12920702/).
- European Statistical Recovery Dashboard: <https://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=sdg.;03:30>.
- European Statistical Recovery Dashboard: <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>.
- Ficarra MG, Gualano MR, Capizzi S, et al. Tobacco use prevalence, knowledge and attitudes among Italian hospital healthcare professionals. *Eur J Public Health*. 2011; 21(1): 29–34, doi: [10.1093/eurpub/ckq017](https://doi.org/10.1093/eurpub/ckq017), indexed in Pubmed: [20219867](https://pubmed.ncbi.nlm.nih.gov/20219867/).
- Pipe A, Sorensen M, Reid R. Physician smoking status, attitudes toward smoking, and cessation advice to patients: an international survey. *Patient Educ Couns*. 2009; 74(1): 118–123, doi: [10.1016/j.pec.2008.07.042](https://doi.org/10.1016/j.pec.2008.07.042), indexed in Pubmed: [18774670](https://pubmed.ncbi.nlm.nih.gov/18774670/).
- Grassi MC, Chiamulera C, Baraldo M, et al. Cigarette smoking knowledge and perceptions among students in four Italian medical schools. *Nicotine Tob Res*. 2012; 14(9): 1065–1072, doi: [10.1093/ntr/ntr330](https://doi.org/10.1093/ntr/ntr330), indexed in Pubmed: [22345319](https://pubmed.ncbi.nlm.nih.gov/22345319/).
- Fiore MC, Jaen CR, Baker TB, et al. Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, 2008.
- Raupach T, Shahab L, Baetzing S, et al. Medical students lack basic knowledge about smoking: findings from two European medical schools. *Nicotine Tob Res*. 2009; 11(1): 92–98, doi: [10.1093/ntr/ntn007](https://doi.org/10.1093/ntr/ntn007), indexed in Pubmed: [19246446](https://pubmed.ncbi.nlm.nih.gov/19246446/).
- Jha P, Ramasundarahettige C, Landsman V, et al. 21st-century hazards of smoking and benefits of cessation in the United States. *N Engl J Med*. 2013; 368(4): 341–350, doi: [10.1056/NEJMsa1211128](https://doi.org/10.1056/NEJMsa1211128), indexed in Pubmed: [23343063](https://pubmed.ncbi.nlm.nih.gov/23343063/).
- Rose G, Hamilton PJ, Colwell L, et al. A randomised controlled trial of anti-smoking advice: 10-year results. *J Epidemiol Community Health*. 1982; 36(2): 102–108, doi: [10.1136/jech.36.2.102](https://doi.org/10.1136/jech.36.2.102), indexed in Pubmed: [7119652](https://pubmed.ncbi.nlm.nih.gov/7119652/).
- Suskin N, Sheth T, Negassa A, et al. Relationship of current and past smoking to mortality and morbidity in patients with left ventricular dysfunction. *J Am Coll Cardiol*. 2001; 37(6): 1677–1682, doi: [10.1016/s0735-1097\(01\)01195-0](https://doi.org/10.1016/s0735-1097(01)01195-0), indexed in Pubmed: [11345383](https://pubmed.ncbi.nlm.nih.gov/11345383/).
- Woloshin S, Schwartz LM, Welch HG. The risk of death by age, sex, and smoking status in the United States: putting health risks in context. *J Natl Cancer Inst*. 2008; 100(12): 845–853, doi: [10.1093/jnci/djn124](https://doi.org/10.1093/jnci/djn124), indexed in Pubmed: [18544745](https://pubmed.ncbi.nlm.nih.gov/18544745/).
- Zhang L, Ren JW, Wong CCM, et al. Effects of cigarette smoke and its active components on ulcer formation and healing in the gastrointestinal mucosa. *Curr Med Chem*. 2012; 19(1): 63–69, doi: [10.2174/092986712803413926](https://doi.org/10.2174/092986712803413926), indexed in Pubmed: [22300077](https://pubmed.ncbi.nlm.nih.gov/22300077/).
- Sadr-Azodi O, Andrén-Sandberg Å, Orsini N, et al. Cigarette smoking, smoking cessation and acute pancreatitis: a prospective population-based study. *Gut*. 2012; 61(2): 262–267, doi: [10.1136/gutjnl-2011-300566](https://doi.org/10.1136/gutjnl-2011-300566), indexed in Pubmed: [21836026](https://pubmed.ncbi.nlm.nih.gov/21836026/).
- Carter BD, Abnet CC, Feskanich D, et al. Smoking and mortality—beyond established causes. *N Engl J Med*. 2015; 372(7): 631–640, doi: [10.1056/NEJMsa1407211](https://doi.org/10.1056/NEJMsa1407211), indexed in Pubmed: [25671255](https://pubmed.ncbi.nlm.nih.gov/25671255/).
- Huncharek M, Haddock KS, Reid R, et al. Smoking as a risk factor for prostate cancer: a meta-analysis of 24 prospective cohort studies. *Am J Public Health*. 2010; 100(4): 693–701, doi: [10.2105/AJPH.2008.150508](https://doi.org/10.2105/AJPH.2008.150508), indexed in Pubmed: [19608952](https://pubmed.ncbi.nlm.nih.gov/19608952/).
- Mahmud A, Feely J. Effect of smoking on arterial stiffness and pulse pressure amplification. *Hypertension*. 2003; 41(1): 183–187, doi: [10.1161/01.hyp.0000047464.66901.60](https://doi.org/10.1161/01.hyp.0000047464.66901.60), indexed in Pubmed: [12511550](https://pubmed.ncbi.nlm.nih.gov/12511550/).
- U.S. Department of Health and Human Services. The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 88. 8406: 1988.

### Address for correspondence:

Prof. Wacław Kuczmik  
Department of General Surgery, Vascular Surgery,  
Angiology and Phlebology, Medical University of Silesia, Katowice  
Ziółowa 45/47, 40–635 Katowice  
e-mail: [wkuczmik@interia.pl](mailto:wkuczmik@interia.pl)

Praca wpłynęła do Redakcji: 30.05.2019 r.