A Review of the Literature on Environmental Health in Slovakia

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Original Article

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Abstract:

Objective: This study provides a literature review on the issue of environmental health in Slovakia
Methods: As of December 31, 2024, we have generated a list of publications within the WOS database for the topic "environmental health in Slovakia". The publications were subsequently classified into groups of indicators designed according to the methodology of the WHO (1999). Publications had to meet a basic criterion, namely the interaction of the environment with human health.
Results: From the 214 publications generated by the WOS database, 70 publications did not meet the criterion of the

presence of environmental interaction with human health. Although 144 publications were categorized into indicator groups, they dealt with environmental health only marginally. **Conclusion:** Almost no attention is paid to the topic of environmental health in Slovakia. We therefore call for continuous monitoring of data and their continuous processing.

Introduction

Good health allows us to live a full life. An individual's health status is influenced by a range of factors, including lifestyle (Viallon et al., 2024), access to healthcare (Gulliford et al., 2002), socioeconomic status (Barakat & Konstantinidis, 2023), and environment (Harting et al., 2014), which directly affect a person's life.

In the face of an ever-changing world, it is essential to study the impact of the environment on human health, not only physical health but also mental health. Environmental health is key to protecting public health and well-being (Birnbaum & Jung, 2011, Petrovič et al . 2023). It encompasses a wide range of areas that assess water, soil, and air pollution, the presence of toxic substances in the environment, and radiation. Climate change and noise also have a major impact on health. These factors affect the human body to varying degrees.

Environmental factors influence disease incidence and mortality worldwide. The most vulnerable populations are children, the elderly and low-income communities (EEA, 2024). However, demonstrating such impacts is difficult and mostly requires detailed and long-term research on the affected sample of people.

Studying environmental health helps to better understand how the environment affects human health, thereby identifying risk factors. It helps to develop effective strategies to prevent disease and reduce mortality, and technologies to protect and improve the environment, thereby improving the health of the population. Environmental health research is interdisciplinary, incorporating knowledge not only from the natural sciences but also from the humanities, applied and interdisciplinary sciences. Research varies in scale from local to global studies covering a wide range of areas.

There are many outputs and publications addressing environmental health issues. A review of the available literature from the WOS database provides an important overview of available publications on environmental health. Such an overview is important for understanding the complex interactions between the environment and human health.

Our study was conducted as a Literature Review Study of the Web of Science database, which is a valuable source of information for researchers, students, and professionals in various scientific disciplines. The study reviews existing research in the field of environmental health in Slovakia, identifies key findings, and assesses the current state of knowledge about the relationships between people and their environment in the form of publications. It also tracks the level of monitoring of the impact of the environment on human health and, conversely, how anthropogenic activities affect the quality of the environment in Slovakia.

Materials and Methods

Publications were searched in the Web of Science database on the topic "Environmental health in Slovakia" as of 31. December 2024. 214 publications were retrieved. By reading the abstracts of all publications, we identified key areas, on the basis of which we provisionally classified them into groups based on the WHO (1999) "Environmental Health Indicators: Profiles and Examples" methodology. The latter contains profiles of indicators that are related to environmental health and are applicable at all levels, from local to international. Following the WHO (1999) methodology, we have selected the following groups:

1. Access to safe drinking water
2. Air pollution
3. Food safety
4. Hazardous/toxic substances
5. Non-occupationl health risks
6. Occupational health risks

7. Radiation
8. Sanitation
9. Shelter
10. Socio-demographic context
11. Solid waste management
12. Vector-borne diseasess

Since the WHO (1999) methodology recommends the creation of new groups of indicators according to available data and needs, we created new groups of indicators following the steps in this methodology:

13. Noise
14. Human influence on environment and health

    As we state in the introduction, given the ever-changing world, it is essential to study the impact of the environment on human health, not only physical but also mental health. We are therefore adding to the group of indoctors:
15. Mental health

    Although the 2030 Agenda is not legally binding, the implementation of its goals by individual countries has been considered crucial in recent years. We have therefore set up a group to address this issue:
16. Agenda 2030

    The basic criterion for sorting WOS publications into groups was that the topic of the publication must address the environmental linkage of diseases. As several publications did not meet this criterion, we created a group of publications that could not be classified into our selected groups:
17. Discarded publications

    Within each group, we assessed the number of included publications, which was used to evaluate and identify potential trends and gaps in research in each area of environmental health. This approach allowed us to better analyze the current state of knowledge on environmental health and to identify deficits in research in the areas.

Results

A search of the Web of Science database related to studies on environmental health in Slovakia generated a total of 214 publications. Although the publications show the interaction of human health with the environment, the concrete term of "environmental health" is not mentioned in any of them. From all publications, 70 (33.02%) did not meet the criteria for inclusion of publications in the environmental health indicator groups.

144 publications met the criteria for inclusion of publications in the environmental health indicator groups, which represents 66.98% of the publications. The largest number of publications dealt with Hazardous/toxic substances (36 publications) and Human influence on environment and health (24 publications) (Figure 1). This was followed in frequency by publications dealing with Food safety (18 publications), Air pollution (18 publications) and Socio-demographic context (17 publications). Fewer than 10 publications were assigned to the groups Agenda 2030 (8 publications), Noise (7 publications), Access to safe drinking water (5 publications), Occupational health risks (4 publications), Vector-borne diseases as well as Radiation (3 publications in each group) and Solid waste management (1 publication). For the WHO (1999) Non-occupational health risks, Sanitation and Shelter groups of environmental health indicators, we did not identify any publications from Slovakia. We also did not identify any publications within our Mental health group.

Toxic Substances and Hazardous Wastes

We allocated four indicators to the group of Toxic Substances and Hazardous Wastes: (1.) Areas contaminated with toxic substances by a major source of pollution, (2.) Impact of toxic substances on human health, (3.) Land management with contaminated soil, and (4.) Management of contaminated water bodies.

We assigned 18 publications for the indicator of *Areas contaminated with toxic substances by a major source of pollution* (Table 1), 9 publications to the indicator of *Land management with contaminated soil*, 4 publications to the indicator of *Management of contaminated water bodies,* and 3 publications to the indicator of *Impact of toxic substances on human health*.

Human impact on environment and health

We allocated five indicators to the group of Human Impact on the Environment with Human

Health Impacts: (1.) Energy and human health, (2.) Forest management effects on air quality and human health, (3.) Green infrastructure development, (4.) Impacts of mining on human health, (5.) Impacts on soils and human health, and (6.) Impacts of water pollution on human health.

We assigned 8 publications to the indicator of *Impacts of water pollution on human health* (Table 2), 6 publications to the indicator of *Forest management effects on air quality and human health,* 4 publications to the indicator of the *Impacts on soils and human health*, 3 publications to the indicator of the *Impacts of mining on human health*, 2 publications to the indicator of the *Energy and human health,* and 1 publication to the indicator of the *Development of green infrastructure*.

Food safety

We allocated two indicators to the group of Safe Food: (1.) Consumption of food quantity and (2.) Monitoring of chemical hazards in food.

We assigned 17 publications to the indicator of *Monitoring of chemical hazards in food* (Table 3) and 1 publication to the indicator of the *Food consumption quantity.*

Air pollution

We allocated four indicators to the group of Air pollution: (1.) Air pollutants from the combustion of solid fuels, (2.) Air pollutants in urban areas, (3.) Air quality management with human health impacts, and (4.) sources of indoor air pollution. We assigned 8 publications to the indicator of the *Indoor air pollution sources* (Table

Figure 1 Percentual representation of publications in individual groups of indicators for environmental health as of December 31, 2024 (Source: Web of Science).

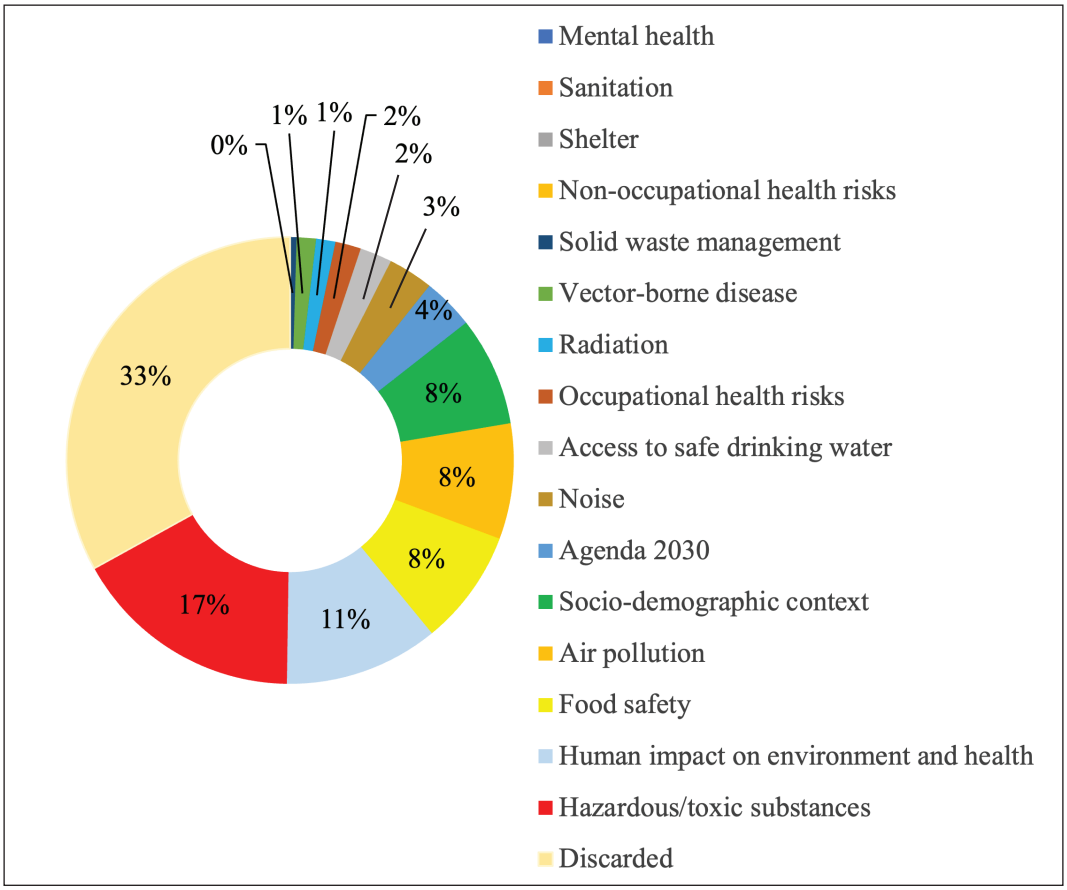


Table 1 Assignment of publications to individual indicators for Toxic Substances and Hazardous Wastes

Areas contaminated with toxic substances by a major source of pollution	
Arsenic in the human body based on urine samples	Ranft et al. (2003)
Bacterial diversity of PAH-contaminated soil	Puškárová et al. (2013)
Impact of PCBs on health status, particularly in newborns and young children	Plíšková et al. (2005); Hovander et al. (2006); Jan et al. (2007); Langer et al. (2007); Park et al. (2007, 2009); Wimmerová et al. (2015); Mondal et al. (2022); Hertz-Pieciotto et al. (2003); Urbanetz et al. (2024)
Pollution from industry	Rapant et al. (2006); Sanciova (2015); Arvay et al. (2017); Mitterpach et al. (2017); Andras et al. (2012)
Prevalence of pesticides in humans	Petrik et al. (2006)
Land management with contaminated soil	
Antimony in sediments in a contaminated area	Zhao et al. (2023)
Assessment of mercury, chromium and nickel accumulation from mining soils in nettle	Hiller et al. (2021)
Determination of mercury in potatoes and soil	Musilova et al. (2017)
Impact of geological contamination on public health	Rapant et al. (2009a,b)
Monitoring of heavy metals in soils and berries	Fedorková et al. (2023)
PCB and PAH assessments	Hiller et al. (2015); Drimal et al. (2016)
Radon measurement in dwellings	Mojzeš et al. (2017)
Management of contaminated water bodies	
Heavy metals in surface waters	Singovszka et al. (2020)
Impact on human and animal health of toxic cyanobacteria	Mališová et al. (2021)
Radon measurement in caves	Ambrosino et al. (2020)
Water pollution on heavy metals and its effects on fishes	Brazova et al. (2012)
Impact of toxic substances on human health	
Blood lead levels in children	Hrubá et al. (2023)
Presence of BFR substances in organisms	Slamecka et al. (2012); van der Schyff et al. (2023)

Table 2 Assignment of publications to individual indicators for Human impact on environment and health

Impacts of water pollution on human health	
Antibiotics in wastewater	Ng et al. (2023)
Application integrated with GIS as a decision support tool for the management of potentially polluted sites as well as for overall water management	Lánczos (2009)
Cyanobacteria growth on water reservoir	Onderka (2007)
Environmental impacts of water management structures	Zeleňáková et al. (2017a)
Evaluation of sludge water using bacteria	Perháčová et al. (2022)
Point sources of water pollution	Sabo et al. (2014)
Water features in urbanized environments with recreational use	Virtudes et al. (2018a,b)
Forest management effects on air quality and human health	
Air purity differences in forests of European countries	Kovac (2016)
Assessment of atmospheric cadmium deposition in forests	Bohdalkova et al. (2020)
Change in forest condition in relation to industrial transformation	Main-Knorn et al. (2009)
Forest quality in relation to sustainable development	Ozkaya & Erdin (2020)
Heavy metals in beech forest soils	Qiu et al. (2022)
Monitoring of air pollution effects on forests	Oszlányi (1997)
Impacts on soils and human health	
Assessing and proposing options for soil revitalization	Huttmanova et al. (2015)
Diversity of microorganisms in contaminated soils	Fazekaš et al. (2018), Fazekašová et al. (2021)
Effect of genetically modified maize on the genetic diversity of rhizosphere bacteria	Ondreičková et al. (2014)
Sorption and desorption of acetochlorine in soil samples	Hiller et al. (2009)
Impacts of mining on human health	
Assessment of the impacts of coal mining on health	Skvarekova & Kozakova (2012)
Potential of uranium deposits in Slovakia	Šofranko et al. (2020)
Risk of environmental burdens	Sevcikova et al. (2021)
Energy and human health	
Assessment of the effects of the thermal power plant on the environment	Zeleňáková et al. (2017b)
Sustainable use of nuclear waste	Labor & Lindskog (2014)
Green infrastructure development	
Development of green areas and green infrastructure	Belčáková et al. (2019)

4), 6 publications to the indicator *Air pollutants in urban areas,* 3 publications to the indicator of the *Air quality management with impact on human health,* and 1 publication to the indicator of *Air pollutants from solid fuel combustion.*

Socio-demographic context

We included six indicators in the group of Socio-demographic context: (1.) Health habits, (2.) Human well-being, (3.) Non-working dependent population, (4.) Population growth in relation to health, (5.) Poverty, and (6.) Vulnerable populations.

We assigned 6 publications to the indicator of *Non-working dependent population* (Table 5), 4 publications to the indicator of the *Human well-being,* 2 publications to the indicator of *Health habits,* 2 publications to the indicator of *Population growth in relation to health,* 2 publications to the indicator of *Vulnerable populations,* and 1 publication to the indicator of the *Poverty*.

Agenda 2030

We included one indicator in the group of Agenda 2030: (1.) Implementation of Agenda 2030, Goal 3 Quality of health and life. We assigned 8 publications to this indicator (Table 6).

Noise

We included four indicators in the group of Noise: (1.) Consequence of high noise intensity on human health, (2.) Excessive noise from restaurants, (3.) Excessive noise from the workplace, and (4.) Excessive noise in urban settlements.

We assigned 3 publications to the indicator of *Excessive noise in urban settlements* (Table 7), 2 publications to the indicator of the *Consequence of high noise intensity on human health,* 1 publication to the indicator of *Excessive noise from restaurants*, and 1 publication to the indicator of *Excessive noise from the workplace.*

Access to safe drinking water

We included two indicators in the group of Access to safe drinking water: (1.) Drinking groundwater quality, and (2.) Waterborne diseases.

We assigned 4 publications to the indicator of *Drinking groundwater quality* (Table 8), and 1 publication to the indicator of the *Waterborne diseases.*

Table 3 Assignment of publications to individual indicators for Food safety

Monitoring of chemical hazards in food	
Dangerous fungi in wine growing areas	Mikušová et al. (2010)
Hazardous toxic substances in meat	Lauková et al. (2000); Lukáčová et al. (2015); Slamecka et al. (2017); Silva et al. (2022)
Impact of mining activities based on heavy metal concentrations in vegetables	Musilová et al. (2022)
Mercury content in mushrooms	Jančo et al. (2021), Árvay et al. (2022), Čeryová et al. (2022)
Milk and feed analyses in relation to hazardous substances	Tunegova et al. (2016), Pšenková et al. (2020); Almásiová et al. (2023); Almášiová et al. (2024)
Safety of fish consumption focusing on mercury and PCB content	Borosová et al. (2014); Desvignes et al. (2017)
Wheat diseases	Blikova et al. (2012)
Food consumption quantity	
Reduction of meat consumption in Poland and Slovakia	Borusiak et al. (2022)

Occupational health risks

We included one indicator in the group of Occupational health risks: (1.) Exposure to hazardous workplaces.

We assigned 4 publications to this indicator (Table 9).

Radiation

We included three indicators in the group of radiation: (1.) Cosmic radiation, (2.) Cumulative radiation dose, and (3.) X-rays in health care facilities.

We assigned 1 publication to the indicator of *Cosmic radiation* (Table 10), 1 publication to the indicator of the *Cumulative radiation dose,* and 1 publication to the indicator of *X-rays in health care facilities.*

Vector-borne diseases

We included one indicator in the group

Table 4 Assignment of publications to individual indicators for Air pollution

Indoor air pollution sources	
Concentrations of airborne bacteria and moulds	Górny & Dutkiewicz (2015)
Improvements in energy efficiency of air exchangers	Földváry et al. (2017)
Indoor air quality in older buildings	Vilčeková et al. (2023)
Indoor air quality in Roma settlements	Majdan et al. (2020)
Indoor air quality in schools	Meciarova et al. (2017)
labour productivity in relation to air quality	Vilčeková et al. (2015)
Presence of particulate matter indoors	Vilčeková et al. (2013); Burdova et al. (2016)
Air pollutants in urban areas	
Chromosome research in relation to air pollution	Beskid et al. (2007)
Correlation between meteorological parameters and particulate matter concentrations	Pekdogan et al. (2023)
Determination of particulate matter concentrations in urban environments	Sarkan et al. (2023)
Exposure to odorous substances	Drimal et al. (2010)
Monitoring the operation of a coal-fired power plant	Thornton et al. (2003)
Worsened emission situation	Krokusova et al. (2013)
Air quality management with impact on human health	
Building design in relation to air quality	Senitkova & Tomcik (2010)
Measures in municipalities aimed at reducing air pollution in Poland and Slovakia	Czuba (2020)
Tobacco quality control and tobacco harm	Willemsen & Nagelhout (2016)
Air pollutants from solid fuel combustion	
Environmental impact of coal combustion emissions and cancer incidence	Bencko et al. (2009)

of Vector-borne diseases: (1.) Spread of vector-borne diseases.

We assigned 3 publications to this indicator (Table 11).

Solid waste management

We included one indicator in the group of Solid waste management: (1.) Solid municipal waste disposal.

We assigned 1 publication to this indicator (Table 12).

Shelter, Sanitation, Non-occupational health risks and **Mental health** - publications from Slovakia are absent.

The time line of publications generated by the WOS database dates back to 1993. The fol-

Table 5 Assignment of publications to individual indicators for Socio-demographic context

Non-working dependent population	
Children's rights for a healthy environment	Lux (2023)
Impact of tobacco smoke on pregnant women and children	Argalášová et al. (2017); Sevcikova et al. (2018)
Increase in the retirement age	Polackova (1999)
Quality of life of people over sixty	Kowalczyk et al. (2024)
Respiratory health of children	Rimarova (2015)
Human well-being	
Evolution of quality of life	**Oláh et al. (2020)**
Impact of the environment on people's health in selected countries	Streimikiene & Vveinhardt (2015)
Influence of factors on the blood pressure of schoolchildren	Rimarova & Frank (2014)
Traveling to school	Brindley et al. (2023)
Health habits	
Health disparities among people in Europe in relation to health habits	Mackenbach (2014)
Purchase of organic food as one of the health habits	Janska et al. (2023)
Population growth in relation to health	
Health status in Roma settlements	Bartosovic (2016)
Quantification of regional differences in mortality influenced by selected environmental factors	Gavurova & Toth (2019)
Vulnerable populations	
Pollutant-induced infant mortality	Schoeters et al. (2011)
Prevalence and elucidation of the causes of anencephaly in Slovakia, the Czech Republic, and Germany	Risova et al. (2024)
Poverty	
Social status in marginalized communities	Krizovsky & Drotarova (2015)

lowing publication was created in 1997. More than 10 publications per year have been published since 2012 (Figure 2).

Discussion

One of the biggest factors in human health is the environment (Herman, 2014). Underlining this importance, the United Nations entities issued a joint statement in 2021 recognizing the "right to a safe, clean, healthy and sustainable environment" for all people (UNEP, 2021). In 2016, WHO released a report entitled "Preventing disease through healthy environments: A global assessment of the burden of disease attributable to environmental risks", estimating how much of global disease could be prevented by modifying the environment. There are more than 12 million deaths globally each year attributed to unhealthy environments according to the Office of Disease Prevention and Health Promotion (WHO, 2016)

Environmental health is therefore one of the most important parts of public health. Public health experts have long recognized that the environments where people live have health consequences at both the individual and community

Table 6 Assignment of publications to individual indicators for Agenda 2030

Implementation of Agenda 2030, Goal 3 Quality of health and life	
Analysis of the national policy of Poland and Slovakia on energy efficiency in the context of the 2030 Agenda	Małajowicz et al. (2023)
Development of the banking sector in the context of meeting the objectives of the Agenda	Bayar et al. (2023)
Environmental burdens and challenges	Majerník et al. (2019), Lieskovska et al. (2020)
Green growth of the economy	Majerník et al. (2017)
Implementation of EU directives	Jurickova (2002)
Implementation of health risk management in the SEA process and sustainable development	Zeleňáková & Zvijaková (2011), Sanciova (2016)

Table 7 Assignment of publications to individual indicators for Noise

Excessive noise in urban settlements	
Assessment of railway noise	Pultznerova et al. (2018)
Impact of noise on the health of inhabitants living in cities	Kuzmova et al. (2017)
Noise-induced sleep disorders in Central Europe	Ristovska & Lekaviciute (2013)
Consequence of high noise intensity on human health	
Assessment of noise exposure to pupils	Filová et al. (2020)
Relationship between noise levels and health	Panulinova et al. (2016)
Excessive noise from restaurants	
Public awareness of the danger of noise from restaurant facilities	Jeram et al. (2013)
Excessive noise from the workplace	
Environmental noise from mining operations in Slovakia	Rovňák et al. (2023)

levels (Kent State, 2024). People who live in a healthy environment may enjoy the positive health effects of their living conditions (Roberts et al., 2022). In contrast, those who don't live in a healthy environment may face a higher risk of chronic diseases and other health hazards that decrease life expectancy.

Environmental hazards such as air and water pollution, lack of access to healthy foods, and exposure to the toxic by-products of industrial and agricultural production are among the environmental risks that can significantly influence human health and well-being (Kent State, 2024).

The monitoring of ambient environmental conditions is essential to environmental management and regulation (Biber, 2013). However, effective monitoring is subject to a range of institutional, political, and legal constraints, constraints that are a product of the need for monitoring to be continuous, long lived, and well matched to the resources being studied.

Several authors point to the issue of data collection for environmental health (Nisbet, 2007;

Table 8 Assignment of publications to individual indicators for Access to safe drinking water

Drinking groundwater quality	
Estimation of health risks from groundwater contamination	Rapant & Krčmová (2007)
Groundwater contamination and human health	Backman et al. (1998), Schmidt et al. (2017)
Relationship between arsenic in groundwater and cancer incidence	Kričković et al. (2022)
Waterborne diseases	
Effect of hardness of water on the cardiovascular system	Rapant et al. (2019)

Table 9 Assignment of publications to individual indicators for Occupational health risks

Exposure to hazardous workplaces	
Exposure of incinerator workers to waste incineration ash	“
Impact of chromium and asbestos on lung cancer incidence and risk factors in the workplace	Fabiánová et al. (1997), Halasova et al. (2005), Gergelová et al. (2006)

Table 10 Assignment of publications to individual indicators for Radiation.

Cosmic radiation	
Influence of solar, geomagnetic and cosmic activity on human physiological parameters	Mavromichalaki et al. (2021)
Cumulative radiation dose	
Cumulative effect of sunlight and arsenic in relation to skin tumors in Hungary, Romania and Slovakia	Surdu et al. (2014)
X-rays in health care facilities	
Slavic gene mutation and X-rays	Chrzanowska et al. (2023)

Doremus, 2008). Many people ask whether we can reliably and efficiently obtain the necessary environmental data for regulation and control (Elzinga et al., 2001; Biber, 2011)?

Ongoing development and implementation of empirically based systematic review methods are required in environmental health to ensure transparent and timely decision making to protect the public's health. According to the Suttorn et al. (2021), systematic reviews produced more useful, valid, and transparent conclusions compared to non-systematic reviews, but poorly conducted systematic reviews were prevalent. The uptake of systematic reviews in environmental health is advancing, but the standards by which the methods are applied have been somewhat variable (Whaley et al., 2021). According to these authors (Whaley et al., 2021), new questions are arising such as "how systematic are reviews in environmental health?" and "do systematic reviews in environmental health result in more transparent and reliable reviews than traditional expert-based, narrative reviews?"

A systematic review in the field of environmental health has not yet been prepared for Slovakia. However, there are systematic reviews at the European level, e.g. A systematic review of water, sanitation and hygiene among Roma communities in Europe: Situation analysis, cultural context, and obstacles to improvement (Anthonj

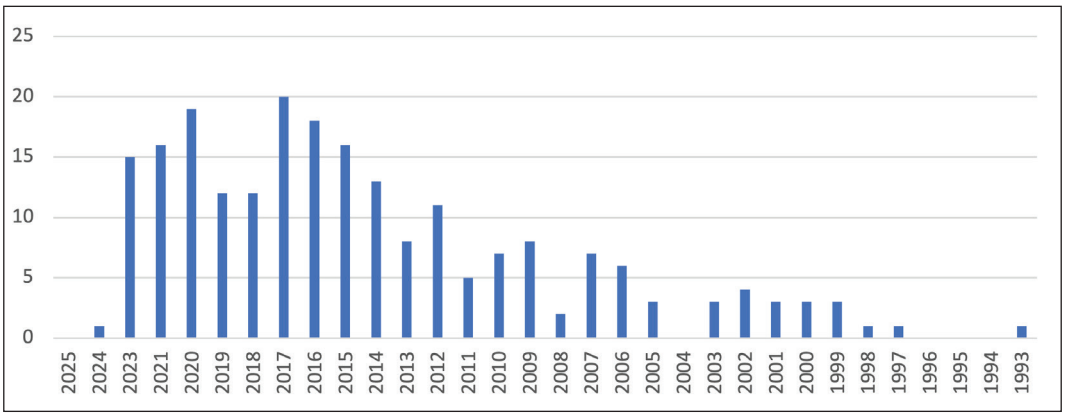
Table 11 Assignment of publications to individual indicators for Vector-borne diseases

Spread of vector-borne diseases	
Faecal bacterial flora of deer with special attention to potential pathogens and anaplasmosis transmitted to humans by infected ticks	Gnat et al. (2015)
Occurrence of enterococci in cow manure	Lauková et al. (2019)
Pathogens transmitted by ticks to humans	Karshima et al. (2023)

Table 12 Assignment of publications to individual indicators for Solid waste management

Solid municipal waste disposal	
Health impacts of landfilling and waste incineration in Italy, the United Kingdom and Slovakia	Forastiere et al. (2011)

Figure 2 Time line of publications generated by the WOS database for the topic "environmental health in Slovakia"



et al., 2020) or at the level of more countries, e. g. Physical activity of children and adolescents from the Czech Republic, Hungary, Poland, and Slovakia: A systematic review (Kantanista et al., 2021)

In an effort to obtain more information about environmental health in Slovakia and to collect data for the field of environmental health, we focused on publications in the WOS database as of December 31, 2024. The oldest publication in the database was published in 1993, which would mean that the authors have been dealing with the issue of environmental health in Slovakia for only the last 28 years. Unfortunately, this oldest publication (Badalik et al., 1993, Supplementary Material) is devoted to the topic New trends in postgraduate health education in Slovakia: first experiences of the School of Public Health in Bratislava. The publication does not meet the criterion of interaction of health and the environment. Another publication was published in 1997 (Oszlányi, 1997), where the author deals primarily with the health of forests and environmental pollution in Slovakia, but also mentions the impact on people's health. Another publication in the field of environmental health in Slovakia comes from 2012, while the authors wrote the most publications in 2023.

We consider the fact that none of the publications deals with the health of the environment comprehensively to be problematic. There are no publications from the continuous data collection of selected indicators throughout Slovakia. All publications are only marginally related to environmental health. For the indicator groups of sanitation, shelter and non-occupational health risks, WOS did not generate any publications. We encourage professionals to also focus on mental health. We hypothesized that the WOS database would contain publications describing the interactions of mental health and the high mountain landscape, which is a hot topic abroad.

Conclusion

The review study provided a comprehensive overview of knowledge on various environmental health factors from the territory of Slovakia available in the Web of Science database. For the topic "environmental health in Slovakia", the WOS database system generated 21 publications as of December 31, 2024. Groups of factors influencing environmental health were selected based on the methodology and recommendations of WHO (1999).

Despite the fact that the system searched for 214 publications after entering the topic "environmental health", we excluded 70 publications (33.02% of them) after a more detailed study because they did not meet the basic criterion – the association of diseases with the environment. The remaining publications could be classified into the indicator groups Hazardous/toxic substances (25%), Human influence on environment and health (16.67%), Food safety (12.50%), Air pollution (12.50%), Socio-demographic context (11.81%), Agenda 2030 (5.56%) over Noise (4.86%), Access to safe drinking water (3.47%), Occupational health risks (2.78%), Radiation and Vector-borne diseasess (2.08%) and Solid waste management (0.69%). For some groups of environmental health indicators, no publications from Slovakia have been published in the WOS database so far (Non-occupational health risks, Shelter, Sanitation and Mental health).

Within one group of indicators, the Human influence on environment and health and Socio-demographic context groups were assessed for 6 indicators each (Figure 3), the Hazardous/toxic substances, Air pollution and Noise groups for 4 indicators each, Radiation for 3 indicators, the Food safety and Access to safe drinking water groups for 2 indicators each, and the Agenda 2030, Vector-borne diseasess, Occupational health risks and Solid waste management groups for 1 indicator each.

We observed a complete absence of publications for 4 groups of environmental health indicators, namely Non-occupational health risks, Shelter, Sanitation and Mental health.

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Figure 3 Groups of indicators and their associated environmental health indicators in Slovakia (according to WHO, 1999)

Group of indicators	Indicators
Human impact on environment and health	1. human activities in forests with an impact on air 2. impacts of human activities on land with implications for human health 3. mining with impacts on human health 4. energy with human health impacts 5. impacts of human activities on water with implications for human health 6. development of green infrastructure
Sociodemographic context	1. population growth in relation to health 2. non-working dependent population 3. poverty 4. vulnerable populations 5. health habits 6. welfare
Air pollution	1. air pollutants from the combustion of solid fuels 2. air quality management with impact on human health 3. sources of indoor air pollution 4. air pollutants in urban areas
Toxic Substances and Hazardous Wastes	1. management of land with contaminated soil 2. management of a contaminated water body 3. an area contaminated with toxic substances by a major source of pollution 4. toxic substances in the human body
Noise	1. excessive noise in the workplace 2. excessive noise from restaurants and night-time establishments 3. excessive noise in urban settlements 4. the effect of high noise intensity on human health
Radiation	1. cumulative radiation dose 2. cosmic rays 3. X-rays in medical facilities
Access to safe drinking water	1. diseases from water 2. drinking groundwater quality
Food safety	1. monitoring chemical hazards in food 2. consumption of food quantity
Agenda 2030	1. meeting the objectives of the health agenda
Occupational health risks	1. exposure to hazardous workplaces
Solid waste management	1. disposal of municipal solid waste
Vector-borne diseases	1. spread of vector-borne diseases in Slovakia

types of Slovak landscape from the early prehistory to the present.

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The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this publication.

Ethical Issue

The authors declared that the study did not require ethics committee approval since no personal data were analysed.

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Data Availability

No

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