



Estimating the prevalence of potentially electrosensitive individuals in Polish population and its potential correlation with light and noise pollution.

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Abstract

This article aims to present survey data collected in 2022, with the objective of estimating the prevalence of electrosensitive individuals in selected major cities in Poland. The obtained survey results have been juxtaposed with available data on noise and light pollution in the examined cities to determine its pollable correlation with the prevalence of electromagnetic individuals.

1. Introduction

Electrosensitivity, also known as electromagnetic hypersensitivity (EHS), refers to a condition in which individuals exhibit physiological symptoms in response to exposure to electromagnetic fields (EMFs) emitted by electronic devices and wireless technologies. Scientific literature on electrosensitivity is still evolving, and the condition is not universally recognized as a distinct medical diagnosis by all experts. Individuals who claim to experience electrosensitivity often report symptoms such as headaches, fatigue, dizziness, and sleep disturbances in association with exposure to electromagnetic radiation. While some studies suggest a possible link between EMF exposure and certain health effects, the overall scientific consensus remains inconclusive, and further research is needed to establish a clear understanding of the mechanisms and potential health implications of electrosensitivity.

Light pollution pertains to the excessive or inappropriate use of artificial lighting, leading to disruptions in the natural light-dark cycle and adversely impacting the environment, human health, and wildlife. Conversely, noise pollution arises when an excess of noise from various sources, such as traffic, industry, or entertainment, disrupts the tranquility of the environment, contributing to potential health and societal repercussions

2. Aim of the study

The objectives of our article were twofold: firstly, to employ a survey methodology to determine which questions effectively discern individuals exhibiting electrosensitivity, and subsequently, to compare the obtained results with data pertaining to electromagnetic

smog pollution, noise pollution, and light pollution in their place of living.

2. Materials and methods

To achieve our goal, we conducted the survey in 12 selected Polish cities with population over 500 thousands of inhabitants. The questionnaire consisted of 15 questions, including demographic (gender, age, place of living and education) and questions regarding sensitivity to various factors. In the Table I, there are our proposed criteria for detecting potential electrosensitivity based on our survey.

des.	Affirmative response to question/selected option
C1	Do you believe that you are electrosensitive or hypersensitive to electromagnetic fields?
C2	Do you believe that devices emitting electromagnetic fields negatively impact your: a) well-being?
C3	Do you believe that devices emitting electromagnetic fields negatively impact your: b) health?
C4	Do you believe that devices emitting electromagnetic fields negatively impact both your well-being and health?
C5	Do you experience any health symptoms related to the use of electrical devices that, in your opinion, others do not experience?
C6	Do you experience any health symptoms related to the use of electrical devices that, in your opinion, others do not experience? If so, were these symptoms severe enough to affect your daily life, or did you consult a physician because of them?

Table I. Postulated criteria for identifying and electrosensitive subjects among responders.

Inhabitants' places of residence are depicted in Figure 1.

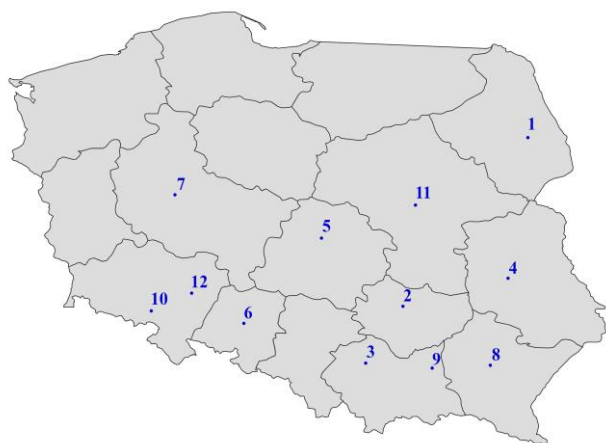


Figure 1. Places of residence of the responders listed in alphabetical order: 1. Białystok, 2. Kielce, 3. Kraków, 4. Lublin, 5. Łódź, 6. Opole, 7. Poznań, 8. Rzeszów, 9. Tarnów, 10. Wałbrzych, 11. Warszawa, 12. Wrocław

3. Results

The survey response results are presented in Table II.

Table II. The percentage of potentially electrosensitive subjects among responders in considered cities using mentioned criteria.

City [see Fig. 1]	Number of responders	Percentage of responders who meet the criteria [see Tab. I] [%]					
		C1	C2	C3	C4	C5	C6
1	100	11,0	21,0	24,0	19,0	7,0	3,0
2	100	13,0	27,0	28,0	22,0	10,0	3,0
3	270	4,4	14,8	19,3	11,1	3,3	1,1
4	120	12,5	16,7	24,2	15,0	6,7	0,8
5	230	4,8	15,2	23,0	11,7	3,5	1,7
6	100	8,0	17,0	29,0	14,0	5,0	0,0
7	180	9,4	16,7	21,1	14,4	6,1	2,8
8	100	8,0	25,0	35,0	24,0	7,0	1,0
9	100	8,0	14,0	25,0	12,0	3,0	1,0
10	100	7,0	19,0	24,0	14,0	2,0	1,0
11	600	7,0	16,5	23,5	13,7	4,3	1,7
12	200	9,0	14,5	17,0	9,0	4,0	2,0

Table III. Information about noise [1] and light [2] pollution in cities. *- no exact data, value below 44; +-no exact data, value below 22000.

city	noise pollution [percentage of people exposed to noise, %]	light pollution [sum of lights, nW*cm ⁻² sr ⁻¹]
1	58	+
2	61	+
3	*	51623,7
4	50	32570,75
5	*	58775
6	65	+
7	*	45195,9
8	55	+
9	*	+
10	*	+
11	44	131074,7
12	49	45180,1

The comparison of data gathered from our survey and information about noise and light pollution (Table III) shown no statistical significance.

4. Discussion

Noise pollution is thought to have an effect on not only physical, but also mental well-being of residents [3,4]. Even a locally occurred light pollution can be a threat, f.e. in an ICU units. [5] Light pollution is also considered harmful [6], even potentially as a factor promoting cancer. [7] Even though, our study did not confirm any correlation between the light and noise pollution and the prevalence of electrosensitive individuals.

References

- [1] Tygodnik Gospodarczy nr 50/2023, Polski Instytut Ekonomiczny, opracowanie PIE na podstawie danych KE [Economic Weekly No. 50/2023, Polish Institute of Economics, prepared by PIE based on EC data].
- [2] Light Pollution Think Tank. Zanieczyszczenie światłem w Polsce. Raport 2023 [Light pollution in Poland. Report 2023], Space Research Centre of Polish Academy of Sciences. Warsaw, 2023.
- [3] Guha M. (2022). Noise pollution and mental health. Journal of mental health (Abingdon, England), 31(5), 605–606.
<https://doi.org/10.1080/09638237.2022.2118694>
- [4] Münzel, T., Sørensen, M., & Daiber, A. (2021). Transportation noise pollution and cardiovascular disease. Nature reviews. Cardiology, 18(9), 619–636.
<https://doi.org/10.1038/s41569-021-00532-5>
- [5] Pal, J., Taywade, M., Pal, R., & Sethi, D. (2022). Noise Pollution in Intensive Care Unit: A Hidden Enemy affecting the Physical and Mental Health of

Patients and Caregivers. *Noise & health*, 24(114), 130–136. https://doi.org/10.4103/nah.nah_79_21

- [6] Cao, M., Xu, T., & Yin, D. (2023). Understanding light pollution: Recent advances on its health threats and regulations. *Journal of environmental sciences (China)*, 127, 589–602. <https://doi.org/10.1016/j.jes.2022.06.020>
- [7] Lamphar, H., Kocifaj, M., Limón-Romero, J., Paredes-Tavares, J., Chakameh, S. D., Mego, M., Prado, N. J., Baez-López, Y. A., & Diez, E. R. (2022). Light pollution as a factor in breast and prostate cancer. *The Science of the total environment*, 806(Pt 4), 150918. <https://doi.org/10.1016/j.scitotenv.2021.150918>