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SELECTED ASPECTS OF THE POPULATION HEALTH STATUS IN ECOLOGICAL HAZARD AREAS IN COMPARISON WITH ECOLOGICALLY "CLEAN AREA". III. LOCALISATION OF URBAN REGIONS WITH HIGH MORTALITY FROM ALL AND FROM THE CIRCULATORY SYSTEM DISEASES

TADEUSZ DUTKIEWICZ, JERZY KOŃCZALIK, CZESŁAW ANDRYSZEK and DARIUSZ RACHAŃSKI

Department of Environmental Health Hazard
The Nofer Institute of Occupational Medicine
Lodz, Poland

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Abstract. Territorial localisation of urban regions with particularly high mortality from all diseases and from diseases of the circulatory system in males and females was the aim of the study. Altogether 177 urban regions within ecological hazard areas (EHAs) and 76 urban regions within reference area (RA) were subjected to evaluation.

In the group of urban regions in which mortality rate from all diseases exceeded the value of arithmetic mean + 1/2 of standard deviation, 32 urban regions of EHA and 12 of them with RA were selected for assessing male mortality and 44 and 7, respectively, for assessing female mortality.

Applying the same criteria 53 and 16 urban regions and 50 and 11 urban regions were identified because of mortality from diseases of the circulatory system in males and females, respectively.

It was revealed that urban regions with the highest mortality rates were located in regions of the highest ecological hazard.

INTRODUCTION

It is generally assumed that mortality is a basic negative parameter of the population health status (1,2,3) and territorial variability of death rates may reflect the incidence of diseases which become the cause of death.

If it is presumed that 75% of death is caused by the three main groups of diseases, the so called civilisation-related diseases (diseases of the circulatory system, neoplasms and injury and poisoning), which are mostly associated with environmen-

Address reprint requests to Prof. T. Dutkiewicz, Department of Environment Health Hazards, The Nofer Institute of Occupational Medicine, P.O. Box 199, 90-950 Lodz, Poland.

tal factors, the territorial analysis of mortality becomes an essential tool for observing the health effects in the population living in regions of environmental degradation and pollution (4,5,6).

In the second part of this study, territorial distributions of mortality were thoroughly analysed in order to evaluate the impact of ecological hazard on negative health indices (7).

This part of the analysis was designed to identify urban regions with particularly high mortality from all diseases and from disease of the circulatory system (DCS) in males and females living in ecological hazard areas (EHAs) and in reference area (RA).

MATERIALS AND METHODS

Data on mortality in urban regions collected in the database during 1989 were analysed. External causes of death (injuries and poisonings) were excluded from general mortality. A direct method was used for the age adjustment of mortality rates. Two sub-groups were distinguished in the total number of urban regions: urban regions within ecological hazard areas (EHAs), and urban region within reference area (RA). The identification of the reference area was based on the analysis of spatial distribution of contamination and environmental degradation from chemicals. The data was obtained from the information collected routinely. The least contaminated eastern districts: Biala Podlaska, Bialystok, Ciechanow, Krosno, Lomza, Siedlce, Zamosc have been selected as reference area.

The territorial analysis of mortality distribution identified urban regions with the highest mortality rates. Urban regions where mortality exceeded the level of median for the set of mortality rate values plus 1/2 standard deviation were included in this group.

Results of the analysis

Mortality from diseases excluding external causes of death manifested a high territorial variability, however, the distribution remained normal (5).

In general, the analysis revealed that mortality in urban regions of EHAs is, on average, higher than mortality observed in urban areas of reference area.

Tables 1 and 2 present lists of urban regions with particularly high mortality from all diseases, namely over 144 deaths per 10 000 among males and over 85 per 10 000 among females.

It is worth mentioning here that the ranking of 27 ecological hazard areas, based on comprehensive measurements of dust and gas emissions, deposits of industrial wastes, sludge of polluted municipal and industrial sewages, degradation of soil and forests, identified regions of particurarly high environmental degradation. These are: Upper Silesia, Cracow, Legnica, Lodz and Gdansk. The latter because of a specific ecological hazard observed in the Gdansk Bay.

In the map (Fig. 1) urban regions with particularly high mortality rates are presented. They are concentrated in areas of the highest ecological pollutions.

Out of 32 urban regions placed in the group of particularly high mortality, almost half of them — 14 are located in the south-west part of Poland and

Table 1. List of towns with high mortality rate from all diseases in males

EHAs			Reference area	
Administrative unit	No of EHA	SMR	Administrative unit	SMR
Strzelce Opolskie	22	187.8	Choroszcz	253.2
Tolkmicko	2	181.8	Knyszyn	181.6
Gogolin	22	179.4	Dukla	181.3
Słomniki	26	177.2	Mordy	168.4
Trzebinia	25	174.3	Biłgoraj	165.0
Swarzędz	3	172.9	Stoczek Łukowski	159.3
Ślesin	6	169.8	Pułtusk	153.0
Chocianów	9	168.2	Terespol	152.0
Krapkowice	22	165.2	Zelechów	151.4
Świętochłowice	25	164.7	Iwonicz-Zdrój	149.2
Barcin	5	164.3	Ciechanowiec	146.5
Jastarnia	2	159.3	Nasielsk	144.7
Braniewo	2	157.6		
Frombork	2	155.7		
Hel	2	154.7		
Brześć Kujawski	7	154.4		
Ruda Śląska	25	154.3		
Aleksandrów Kujawski	4	154.1		
Luboń	3	153.6		
Wejherowo	2	150.6		
Bytom	25	150.2		
Zawidów	16	148.1		
Proszowice	26	147.8		
Mysłowice	25	147.3		
Chorzów	25	146.3		
Katowice	25	146.2		
Pruszcz Gdański	2	146.1		
Aleksandrów Łódzki	12	145.3		
Piekary Śląskie	25	145.3		
Inowrocław	5	145.1		
Kamień Pomorski	1	145.0		
Chrzanów	25	144.6		

among them 9 in Upper Silesia – area of ecological disaster. They are: Trzebinia (174.3 deaths per 10 000), Swietochlowice (164.7), Ruda Slaska (154.3), Bytom (150.2), Myslowice (147.3), Chorzow (146.3), Katowice (146.2), Piekary Slaskie (145.3) and Chrzanow (144.6).

Another agglomeration of urban regions with particularly high male mortality is Gdansk EHA-7 urban regions with high male mortality is the Gdansk Bay: Tolkmicko takes the second place among all 178 urban regions in EHAs (181.8 death per 10 000), Jastarnia (159.3), Braniewo (167.6), Wejherowo (150.6) and Pruszcz Gdanski (146.1), situated further from the sea-side.

Out of 44 urban regions of particurarly high female mortality in EHAs, 28 (64%) are located in the south west part of Poland (Table 2). Already 14 urban regions are placed in the Upper Silesia EHA and 4 in the Gdansk EHA.

Table 2. List of towns with high mortality rate from all diseases in females

EHAs			Reference area	
Administrative unit	No of EHA	SMR	Administrative unit	SMR
Puck	2	131.3	Choroszcz	130.7
Leśnica	22	126.7	Ciechanowiec	124.8
Tolkmicko	2	122.7	Siemiatycze	99.6
Jastarnia	2	106.7	Parczew	89.7
Skawina	26	104.8	Zagórz	88.7
Chorzów	25	104.6	Lesko	87.4
Piekary Śląskie	25	104.6	Ciechanów	86.2
Świętochłowice	25	103.2		
Boguszów-Gorce	18	102.3		
Chocianów	9	100.6		
Łaziska Górne	25	99.2		
Kamień Pomorski	1	98.7		
Gogolin	22	97.7		
Chrzanów	25	97.5		
Pruszcz Gdański	2	97.1		
Siemianowice Śląskie	25	96.0		
Łódź-Widzew	12	94.9		
Zawidów	16	93.6		
Trzebinia	25	93.2		
Knurów	23	93.1		
Ruda Śląska	25	91.9		
Krapkowice	22	91.2		
Złotoryja	9	90.3		
Prochowice	9	90.3		
Kowary	17	89.6		
Zgierz	12	89.1		
Bytom	25	88.7		
Poznań-Jeżyce	3	88.4		
Zgorzelec	16	88.1		
Zabrze	25	88.1		
Mikołów	25	88.0		
Tarnów	27	87.9		
Mysłowice	25	87.8		
Wejherowo	2	87.8		
Zdzieszowice	22	87.6		
Czechowice-Dziedzice	25	87.2		
Łódź-Śródmieście	12	86.9		
Hel	2	86.8		
Nowa Dęba	21	86.2		
Polkowice	9	86.1		
Reda	2	85.9		
Brzeszcze	25	85.6		
Wodzisław Śląski	23	85.2		
Tomaszów Mazowiecki	13	85.1		

Fig. 1. Urban regions with high mortality rate from all diseases.

Urban regions with the highest mortality from all diseases in males – 12 and in females – 7, are also located in the reference area. Particularly high mortality rates are noted for man an women in Choroszcz where a mental hospital operates. It takes the first place among all standardised mortality rate values in urban regions in Poland – (253.2) and (130.7), respecitively.

Urban regions with particularly high mortality from diseases of the circulatory system (DCS)

Bearing in mind the afore-said criteria, urban regions where mortality rates exceeded 75 deaths per 10 000 in the group of males and similarly 50 in the group of females were classified as those with particularly high rate of mortality from DCS. The list of these urban regions are presented for men in Table 3 and for women in Table 4, and their localisation is shown in Fig. 2.

Out of 69 urban regions with high male mortality as many as 53 (almost 75%) are located in EHAs. Already 19 of these regions belong to the Upper Silesia EHA. Further 21 (30%) are situated in other most polluted EHAs, namely: 6 in Gdansk, 5 in Opole, 5 in Inowroclaw, and 5 in Legnica – Glogow. The territorial distribution of 21 urban regions with high female mortality differs from the distribution observed in the group of males 6 (30%) in, the Upper Silesia EHA, 3 in the Gdansk EHA, and 3 in the Legnica – Glogow EHA).

Out of 76 urban regions in the reference area, 16 for males and 11 for females were included in the group of urban regions with particularly high mortality from DCS.

Table 3. List of towns with high mortality rate from the circulatory system diseases in males

EHAs			Reference area	
Administrative unit	No of EHA	SMR	Administrative unit	SMR
Barcin	5	116.10	Dukla	142.20
Tolkmicko	2	112.49	Choroszcz	112.95
Gogolin	22	112.35	Ciechanowiec	102.72
Strzelce Opolskie	22	109.11	Knyszyn	91.38
Hel	2	102.29	Biłgoraj	88.82
Chocianów	9	101.25	Drohiczyn	85.79
Słomniki	26	100.72	Parczew	84.32
Luboń	3	98.09	Stoczek Łukowski	82.31
Kuźnia Raciborska	22	94.80	Szczebrzeszyn	82.19
Krapkowice	22	93.60	Łuków	81.10
Świętochłowice	25	91.66	Płońsk	80.63
Kamień Pomorski	1	91.21	Sokółka	80.6
Frombork	2	91.21	Międzyrzec Podlaski	79.00
Swarzędz	3	90.57	Pułtusk	77.14
Trzebinia	25	90.05	Hrubieszów	76.81
Zawidów	16	88.33	Sokołów Podlaski	75.59
Mysłowice	25	87.41		
Ruda Śląska	25	87.31		
Brzeszcze	25	87.18		
Głuszyca	18	85.63		
Przemków	9	84.79		
Jedlina Zdrój	18	84.50		
Myszków	24	84.36		
Chorzów	25	84.31		
Bytom	25	84.29		
Kruszwica	5	83.95		
Kleczew	6	83.03		
Tarnowskie Góry	25	82.93		
Inowrocław	5	82.54		
Chrzanów	25	82.47		
Skawina	26	81.95		
Świebodzice	18	81.14		
Pakość	5	81.13		
Czechowice-Dziedzice	25	81.08		
Aleksandrów Kujawski	4	80.83		
Zdzieszowice	22	80.74		
Katowice	25	78.91		
Krzeszowice	26	78.81		
Chojnów	9	78.51		
Knurów	23	77.81		
Tomaszów Mazowiecki	13	77.81		
Piekary Śląskie	25	77.72		
Łódź-Śródmieście	12	77.64		
Poznań-Jeżyce	3	77.24		
Leszczyny	23	77.20		
Janikowo	5	77.17		
Aleksandrów Łódzki	12	77.09		
Mielec	21	76.74		
Proszowice	26	76.47		
Siemianowice Śląskie	25	76.05		
Chełmek	25	75.95		
Zawiercie	24	75.31		

Table 4. List of towns with high mortality rate from the circulatory system diseases in females

EHAs			Reference area	
Administrative unit	No of EHA	SMR	Administrative unit	SMR
Leśnica	22	110.22	Choroszcz	76.96
Chocianów	9	81.50	Ciechanowiec	75.23
Tolkmicko	2	71.45	Zagórz	73.49
Łaziska górne	25	69.67	Lesko	58.94
Skawina	26	68.71	Mordy	57.26
Zawidów	16	67.09	Czarna Białostocka	54.45
Nowa Dęba	21	66.78	Jasło	54.37
Chrzanów	25	64.82	Wągrów	52.72
Chorzów	25	63.72	Raciąż	51.85
Świętochłowice	25	63.24	Jedlicze	50.74
Polkowice	9	62.15	Hrubieszów	50.30
Piekary Śląskie	25	61.40		
Łódź-Widzew	12	61.39		
Czechowice-Dziedzice	25	60.92		
Boguszów	18	60.55		
Kleczew	6	60.43		
Trzebinia	25	59.58		
Zdzieszowice	22	59.14		
Słomniki	26	58.71		
Gogolin	22	58.54		
Tarnów	27	58.19		
Zgorzelec	16	56.50		
Brzeszcze	25	56.42		
Leszczyny	23	55.68		
Krapkowice	22	55.04		
Pabianice	12	54.34		
Siemianowice Śląskie	25	54.23		
Ruda Śląska	25	54.15		
Zgierz	12	53.20		
Bogatynia	16	53.14		
Mikołów	25	53.09		
Libąż	25	53.08		
Ciechocinek	4	52.82		
Tomaszów Mazowiecki	13	52.56		
Puck	2	52.44		
Chojnów	9	52.38		
Mysłowice	25	52.35		
Świebodzice	18	52.31		
Dąbrowa Górnicza	25	52.06		
Kraków-Śródmieście	26	51.74		
Puszczykowo	3	51.49		
Częstochowa	19	51.09		
Zabrze	25	50.95		
Bytom	25	50.80		
Szczawno-Zdrój	18	50.61		
Jastarnia	2	50.56		
Reda	2	50.53		
Jawor	9	50.52		
Świnoujście	1	50.37		
Złotoryja	9	50.03		

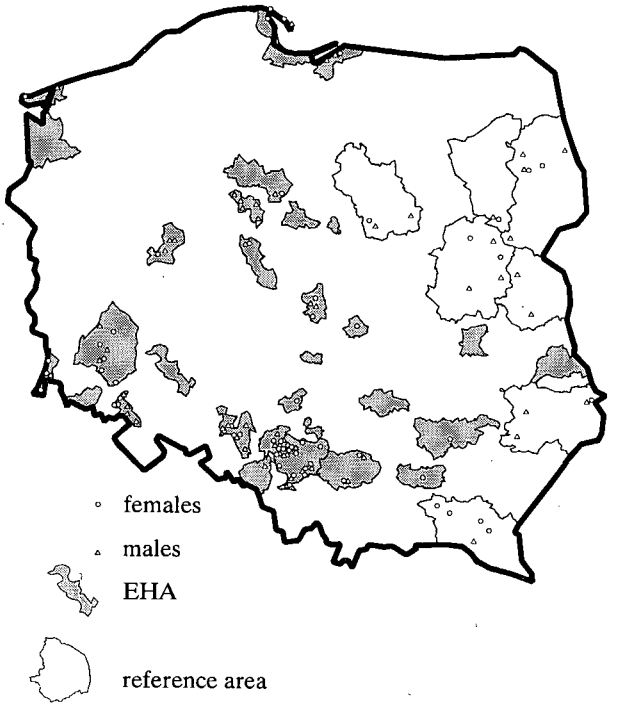

Fig. 2. Urban regions with high mortality rate from the circulatory system diseases.

CONCLUSIONS

The population health status in territorial units depends, to a great extent, on the demographic situation. However, repeated analyses as well as, the pattern of mortality causes prove, undoubtedly, that certain environmental conditions (levels of ecological hazard) produce adverse health effects.

The localisation of urban regions with particularly high mortality rates provides a reliable evidence on the negative impact of the environmental degradation and ecological hazard on the population health status reflected in mortality rates.

Urban regions with the highest mortality rates from all diseases and from the circulatory system diseases in males and females are agglomerated in areas of the highest environment pollution, and the Upper Silesia and Gdansk EHAs take the first place among them.

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