

The Impact of Multidimensional Process of Society Pauperisation on the Global Disease Diffusion - an Analysis of the Problem with the Use of a Cartographic Method of the Research

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Abstract. In the dualistic geographic time-space, the notions: health-disease and poverty-richness create a network of mutual links which have an impact on the occurrence of global civilisation inequalities. These links are considered in the context of multidimensional pauperisation process and spatial disease diffusion. The research on global population health condition, which is a resultant not only of the human biology, but first of all, of the lifestyle in the changing global social and economic conditions, becomes a crucial issue. The understanding of the above-mentioned cause and effect process takes place by the application of the cartographic methods of research support within the medical geography. The medical cartography becomes a system to support the forecast for the global epidemic threats.

Keywords: pauperisation, diseases, medical cartography

1. Introduction

A basis for contemporary considerations with reference to multidimensional notion of health, and by the same, to its determinants, makes up a definition suggested in 1948 by the World Health Organisation: *The health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity*¹. The definition suggested by the WHO refers to the holistic attitude to health condition in the socio-ecological paradigm². The functioning of the socio-ecological paradigm in

¹<http://www.who.int/about/definition/en/print.html> - Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

² The suggestion to consider health and disease as a paradigm was put forward by Teresa Bernadetta Kulik in [edition] Kulik T.B, Latalski M., 2002, *Zdrowie publiczne*. Czelej Publishing House Sp. z o.o., Lublin, page 15.

medical sciences is therefore characterised by the determinants of the health condition as a *sui generis* geoinformation. The characteristics make it possible to apply geographic theories and quantitative and qualitative methods of spatial analysis, represented by medical cartography in the research on the rules, governing the impact of human lifestyle and socio-economic factors on the health of global population (Pantylej 2008). As to the health of the global population, it is defined as the “Global Health” and it becomes a basis to analyse the global epidemic threats in the light of contemporary globalisation processes (Pilarska 2012).

2. The Process of Pauperisation and Contracting Diseases by the Global Population

2.1 Health condition of the global population

The cartographic research on the impact of multidimensional process of pauperisation on disease diffusion requires primarily determining the health condition of the global population. Furthermore, an analysis of disease pathogens load imposes a necessity of a *sui generis* generalisation of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) expressed by the separation of two basic classification units:

- contagious and parasitic diseases;
- civilisation-related non-contagious diseases.

The global pathogens load is expressed with the use of deaths rate in both the above-mentioned disease categories. An analysis of the WHO medical statistics showed that the mortality in contagious diseases in developing countries of Africa and South-East Asia was 7 million people in 2008³. The most popular contagious diseases in this region of the world are: HIV, diarrhoea diseases and tuberculosis. In the developed countries, apart from the HIV infections, a high morbidity rate of childhood diseases is observed.

Amongst civilisation-related non-contagious diseases, a particular role is played by heart diseases and cancers. The ischaemic heart disease is the most frequent cause of death amongst the above-mentioned disease categories (over 7 million deaths in 2008⁴). The largest rate of fatal cases occurs in developing countries in the Western Pacific region, while the region of North and South Americas is characterised by the lowest rate. The global load with cancers is characterised by a spatial morbidity inversion, showing

³ Calculations based on the WHO data from <http://www.apps.who.int/ghodata>

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in the highest number of deaths in the developed countries. The most spread are trachea, bronchus and lung neoplasms. Furthermore, there is a wide-spread incidence of uterine cervix cancer in women.

To sum up, we shall emphasize the fact that through the application of an analysis of medical statistics gathered in the WHO databases, the health condition of the global population appears to be a *sui generis* mosaic of diseases.

2.2 Cartographic Descriptive Algorithm of Dependency between Pauperisation and Disease Diffusion

An analysis of the global population health condition is an initial stage of the proper procedure of research on the dependency between the process of pauperisation and the spread of diseases by the cartographic methods. At the next stage, through the application of mortality rate *pro rata* as a selection criterion, representative diseases were selected which make up a basis for an analysis of the dependency (contagious and parasitic diseases as well as civilisation non-contagious diseases). Setting forth the other parameter of the analysis of dependency was related to the contemporary holistic health concept. It was acknowledged that the multidimensional process of pauperisation has an impact on the social unit and the society, and it is a resultant of health loss factors. Therefore, four types of pauperisation were separated, represented by its twenty four symptoms (Pilarska 2012):

- *pauperisation of the pro-health individual behaviour, arising from processes of globalisation and westernisation;*
- *pauperisation of the household environmental sanitary conditions;*
- *socio-economic pauperisation on the regional level;*
- *geographic environment pauperisation, shown in the global climatic changes and deforestation process.*

The point of departure for the selection of a cartographic method of research appropriate for the research on the dependency between the process of pauperisation and the spreading out of diseases, was the proper definition of the type of epidemiologic analysis. The above research of a retrospective nature, based on secondary data, with the use of measures of diseases spread, indicated the method of two-variable choropleth map in the case of civilisation-related non-contagious diseases and the method of continuous round choropleth map in the case of contagious and parasitic diseases. Below, two maps are presented as an example, showing the dependencies described (*Figure 1* and *Figure 2*).

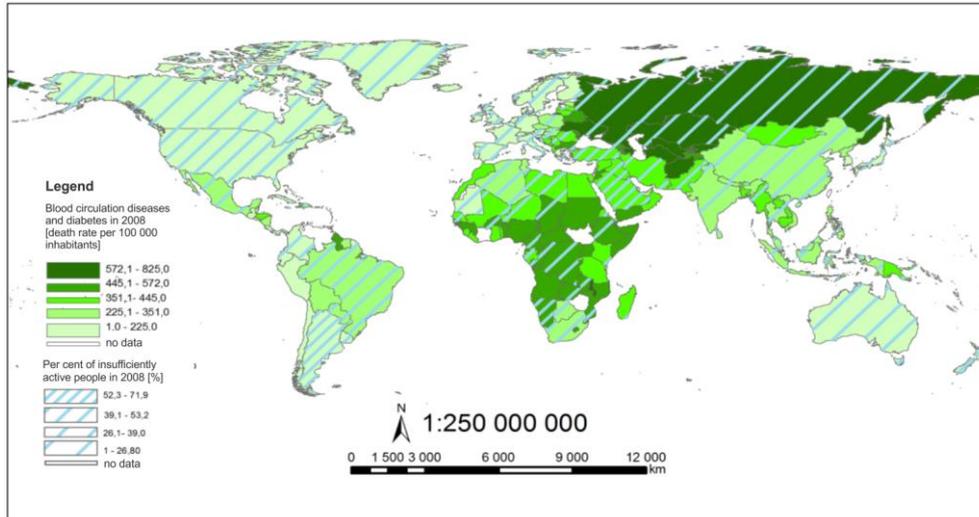


Figure 1. Dependency between blood circulation diseases and diabetes and the per cent of insufficiently active people in 2008 (own elaboration, based on the WHO data from <http://www.apps.who.int/ghodata> [10.04.2012] in ArcGIS 9.3.1., shapefile with the world states from www.naturalearthdata.com [10.02.2012], made available within the public domain).

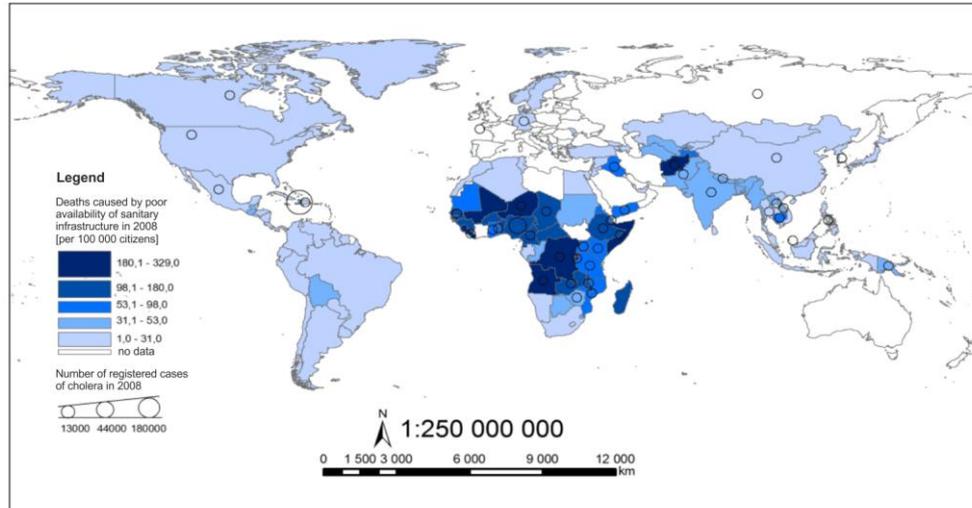


Figure 2. Dependencies between morbidity and death rate caused by poor availability of sanitary infrastructure in 2008 (own elaboration, based on the WHO data from <http://www.apps.who.int/ghodata> [10.04.2012] in ArcGIS 9.3.1., shapefile with the world states from www.naturalearthdata.com [10.02.2012], made available within the public domain).

The application of two-variable choropleth map and the continuous round choropleth map showed an existence of a spatial dependency between the spatial process of pauperisation and the spread out of diseases in the global scale. Unfortunately, within the above methods, it is not possible to define the force of these dependencies. The force of dependency between the pauperisation and the spread out of diseases was set forth on the grounds of the calculated quotient of chances to fall ill, number of deaths and a list of the World Health Organisation's data related to "Population-Attributable Fraction" and "Prevalence". Furthermore, as a result of the analysis, a *sui generis* bi-polar morbidity was noticed, appearing in the form of prevalence of morbidity to contagious diseases in developing countries and a prevalence of morbidity to civilisation-related non-contagious diseases in the developed countries. The territory of South-Eastern Asia was separated as the zone of mutual penetration of contagious and non-contagious diseases.

4. Conclusion

An analysis conducted with the use of the method of two-variable choropleth map and the continuous round choropleth map showed that the process of pauperisation of pro-health individual behaviour has an impact on the spread out of non-contagious civilisation-related diseases, arising from the processes of globalisation and westernisation. Furthermore, the research proved that the pauperisation of the population has an impact on the health condition, not only in the developing countries but also in the developed ones. The use of the cartographic method to support the research confirmed the claim on the global bi-polar morbidity and separated the territory of South Eastern Asia as an area where the contagious and non-contagious diseases penetrate each other.

To sum up, we must emphasize the fact that the use of the methods of cartographic visualisation to characterise the global morbidity, indicates new possibilities to create a system, supporting the global forecasting of epidemic threats.

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