Chapter VII

Life satisfaction and its dependence on the diversity of socio-economic development and accessibility to public healthcare

The aim of the socio-economic development is the satisfaction derived by people from making changes. One of the main roles in the perception of satisfaction, including the health aspect of life, plays access to healthcare services, cover in particular those provided by the State, and therefore, to the public healthcare services. Healthcare is one of the basic tasks of modern states, and issues relating to them are of interest to various disciplines, including: public health, economics, politics and law. Events of the transformation started in the second half of the twentieth century
shaped the realm of economic and social policy, including health caused a delay in relation to the "old" EU members. The good side of this delay is that Poland could benefit from the achievements and experiences of these countries and mitigate the existing differences. Access to health care in Poland is regulated by the adequate law Act [1]. The study demonstrates the existence of regional differences in access to public health services in Poland in 2010.

METHODS

To show the regional disparities and inequality in access to public healthcare system in Poland in 2010 year, as an entity of regional autonomy, the voivodeships were used, because of the fact that the voivodeship branches of the National Health Fund shall oversee and coordinate the implementation the health policy. Poland is divided into 16 voivodeships.

Due to the fact that GDP per capita does not carry information about the distribution of income in society, does not indicate the level of illiteracy, infant mortality and life expectancy of people, cannot be treated as the sole determinant of the level of economic development. For this purpose, the Human Development Index (HDI) for each voivodeship of Poland was analyzed. Methodology to calculate the HDI is well known and is presented by UNDP [2]. Human Development Index is a synthetic measure that describes the effects of socio-economic development of individual voivodeship. This system firstly was introduced by the United Nations for the purpose of international comparisons. Because of its universality it could be implemented to the regional research too. HDI measures the average achievements of a region in three basic dimensions of human development:

1) healthy and long life, assessed using the ratio of the average length of life;

2) education (knowledge), the measured indicators: a literacy - the ability to read and write with understanding, former school;

3) standard of living, defined by GDP per capita in PPP terms. Individual meters have fixed ranges of values, which currently are: the average life expectancy: 25-85 years; the overall enrollment rate: 0-100%; reading comprehension and writing: 0-100% indicator; gross domestic product per capita at purchasing power parity in USD currency (U.S. $ PPP) per capita

Voivodeships, using quartile method, were divided into four groups according to the HDI. The calculated value of Human Development Index is presented in Table I. Voivodeships, using quartile method also, were divided into four groups according to the satisfaction index (HSI).

To determine the degree of accessibility to public health services in Poland taxonomic measure of accessibility (TMA) was used. The mentioned measure was used as the indicator of the access to health care and was calculated using the Hellwig method [3]. Firstly statistical features had been selected (Table I).
Life satisfaction and its dependence on the diversity of socio-economic development and accessibility to public healthcare

Table I Statistical features

<table>
<thead>
<tr>
<th></th>
<th>Statistical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>No of physicians in public health care service sector per 10 000 inhabitants</td>
</tr>
<tr>
<td>X₂</td>
<td>Specialists involved in the total no of physicians in public health care service sector [%]</td>
</tr>
<tr>
<td>X₃</td>
<td>Number of nurses per 10 000 inhabitants in public sector</td>
</tr>
<tr>
<td>X₄</td>
<td>No of hospital beds per 10 000 inhabitants in public sector</td>
</tr>
<tr>
<td>X₅</td>
<td>No of GPs teams (GP contracts with NHF) per 10 000 inhabitants</td>
</tr>
<tr>
<td>X₆</td>
<td>No of physicians in GPs team per 10 000 inhabitants</td>
</tr>
<tr>
<td>X₇</td>
<td>Health expenditure in voivodeship per capita [PLN]</td>
</tr>
</tbody>
</table>

After determining the pattern of access to medical services \( y_{0j} = \max_{i} y_{ij} \) where “\( j \)” is a stimulant, the taxonomic distances, between the individual and the object model, was established. To determine the object model, the average values for each feature were used. The maximum TMA index for the model object is equal “1”. Synthetic measure for each unit is described by the formula:

\[
d_i = 1 - \frac{c_i}{c_0}
\]

where, \( d_i \) - a measure of accessibility; \( c_i \) - taxonomic distance of each unit \( z_{ij} \) to model object \( z_{0j} \); \( c_0 \) - a critical distance from the model of the unit. Used multiplicities are expressed as:

\[
c_0 = \sqrt{\sum_{j=1}^{n} (z_{ij} - z_{0j})^2} \quad \text{where} \quad z_{ij} = \frac{z_{ij} - z_{0j}}{s_j}
\]

and

\[
c_0 = \bar{c}_0 + 2S_d \quad \text{and} \quad \bar{c}_0 = \frac{1}{n} \sum_{j=1}^{n} c_{ij}
\]

Values of taxonomic measure of accessibility (TMA) are presented in Table II. Disparities in access to public health care, according to TMA can be observed.

To examine the relationship between HIS and the availability of health care represented by TMA, and HDI, analysis of variance was used. Voivodeships were divided into four groups based on the quartile of HDI and TMA. Two hypotheses were posed: (1) Hypothesis 0: mean values are equal in quartile groups; (2) Alternative hypothesis: mean values are differing.

Table II HDI, TMA and HSI indexes

<table>
<thead>
<tr>
<th>Voivodeship</th>
<th>HDI</th>
<th>TMA</th>
<th>HSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolnośląskie</td>
<td>0.8947</td>
<td>0.7417</td>
<td>0.5900</td>
</tr>
<tr>
<td>Kujawsko-pomorskie</td>
<td>0.8806</td>
<td>0.7483</td>
<td>0.5900</td>
</tr>
</tbody>
</table>
DATA SOURCES

Data for calculating HDI as: population, schooling indexes, life expectancy and Gross domestic product per capita (GDP) derived from purchasing power parity calculations, were obtained from the Database of the Central Statistical Office. Satisfaction index (HSI) was calculated based on data from the Central Statistical Office [4]. Data for calculating taxonomic measure of accessibility (TMA) includes such data as: number of physicians and nurses, no of hospital and hospital beds, GPs teams and number of GPs contracts with National Health Found and health expenditure in each voivodeship. The above data were collected from databases of: Ministry of Healthcare, National Health Found (NHF), Found and ZOZ Registry - Registry CSIOZ Health Care Facilities, Central Statistical Office. The number of physicians, nurses, no of hospital and hospital beds were taken from the database of the Ministry of Healthcare [5]. Data on the GPs teams and contracts with NHF and health care services provided under these contracts were obtained from the database of the Found and ZOZ Registry - Registry CSIOZ Health Care Facilities [6; 7]. Population, schooling indexes, life expectancy and GDP data were obtained from the Database of the Central Statistical Office [8; 9; 10].

STATISTICAL ANALYSIS

A measure of health satisfaction index (HSI) has been tested for correlation with socio - economic development (HDI) and the taxonomic measure of access to medical services (TMA) The level of statistical significance was set at \( P <0.05 \). Data were analysed with STATISTICA (data analysis software system), version 9.1.
RESULTS

The analysis of variance (HSI / HDI) shows that there is no reason to reject the null hypothesis, therefore, the average quartile groups did not differ in a statistically significant way. Value of the F-statistic and p-value significantly higher than the assumed level of alpha = 0.05.

The analysis of variance (HSI / TMA) indicates that there is no reason to reject the null hypothesis, therefore, the average quartile groups did not differ in a statistically significant way points to the value of the F-statistic and p-value significantly higher than the assumed level of alpha = 0.05.

Table III Table of correlation

<table>
<thead>
<tr>
<th>Index</th>
<th>TMA</th>
<th>HDI</th>
<th>HSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMA</td>
<td>1.0000</td>
<td>-0.0309</td>
<td>0.2347</td>
</tr>
<tr>
<td></td>
<td>p= ---</td>
<td>p= 0.910</td>
<td>p= 0.382</td>
</tr>
<tr>
<td>HDI</td>
<td>-0.0309</td>
<td>1.0000</td>
<td>-0.1312</td>
</tr>
<tr>
<td></td>
<td>p= 0.910</td>
<td>p= ---</td>
<td>p= 0.628</td>
</tr>
<tr>
<td>HSI</td>
<td>0.2347</td>
<td>-0.1312</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>p= 0.382</td>
<td>p= 0.628</td>
<td>p= ---</td>
</tr>
</tbody>
</table>

Source: Own calculation

Table of correlation (Table III) indicates that between satisfactions index (HSI) and measure of accessibility to the public healthcare (TMA) and also the socio-economic development index (HDI) of voivodeships, relationship is not observed. During the study, the correlation between the HSI and TMA and HDI, gave a negative result. One of the reasons for the lack of differentiation due to the HDI and TMA can be low volatility HSI. The coefficient of HSI variation was 3.79%, while a sufficient level of variation, considered by the literature should to be at least 10%.

DISCUSSION

Analysis of the table (Table III) indicates that there is a weak negative correlation between the level of socio-economic development and the level of satisfaction with the health aspect of the inhabitants of the regions concerned. The results of the study indicate that the inhabitants of areas with a high level of socio-economic development (mazowieckie, wielkopolskie) show greater dissatisfaction with their health. In the case of the mazowieckie and wielkopolskie index HSI is equal 0.56 at HDI equal respectively 0.9258 and 0.8998. But regarding to the availability index
(TMA) in these provinces, we notice that this two voivodeships lie on the opposite sites of the access to public healthcare services.

One of the factors which may combine the inhabitants of polarized, according to TMA, provinces is aware of the role of health in the lives of individuals and society, and greater attention to their own health and family.

Figure 1 Accessibility to public healthcare in Poland in 2010
The low level of accessibility to public healthcare services in Poland can be observed in the pomorskie, lubuskie or małopolskie too. In these regions the percentage of people satisfied with their health (pomorskie, lubuskie) is equal to 59%. Only in małopolskie, percentage of satisfied people is higher and amounts to 61%. In this group of provinces, there are areas with a high HDI index (pomorskie – 0.9860; małopolskie – 0.8910).

The correlation between the socio-economic development and regional diversity in access to public healthcare in Poland on the population satisfaction from health aspect of their life gave negative result, and it allow us to say that linear dependency between the examined factors doesn’t exists. At the present stage of research (NUTS-2 level), it is not possible to precisely quantify the relationship between test parameters. In each province there are regions (counties, municipalities) poorer and richer and with different levels of access to health care. It is possible that the delimitation of Polish area with respect to the parameters set out in this paper would give the real answer and solve the presented research problem.

It is necessary to underline, that no correlation between the TMA and the level of HDI has been found. Only in mazowieckie voivodeship we can unequivocally state that the high level of access to public health services correlates with high level of socio-economic development. mazowieckie with main city Warsaw, rather than in
other parts of Poland may offer more possibilities for physicians. It is significant that the shortage of specialists, which has a significant impact on access to basic health care, occurs in regions with a high HDI (pomorskie, zachodniopomorskie, malopolskie) and a low level of the index (lubuskie). One of the explanations can be the migration of physicians [11; 12]. Physicians choose the place of their employment depending on the offer and demand on the labour market and on the advantages that each environment offers. As early as during their internship, physicians mostly choose to work in the main cities of regions where you can find medical schools and universities rather than in other part of Poland, or try to create their own future abroad [13; 14].

The following factors play a considerable role in forming this situation: international migration of physicians; Circular migration - in border areas, locum work, shift work; mostly to Germany, Great Britain, Scandinavian countries (pomorskie, lubuskie, zachodniopomorskie,); Internal migration - from the regions where medical universities are located, and where specialists live and are employed (as first working place) to regions where there are no such units and the demand for specialists are higher than in their home regions and form public to private sector. The above mentioned factors could be treated as reason of the negative impact for population satisfaction from their health.

Interregional and international migration is not unique only to the Polish territory. It is also evident in many other countries [15; 16; 17; 18; 19; 20]. Unlike in other countries, the salaries of Polish physicians cannot be the only one explanation for uneven distribution of physicians between richer and poorer voivodeships. The value of taxonomic measure of accessibility to public health care in one of the reaches region in Poland - Wielkopolskie voivodeship, is lower than in the poorest one as warmińsko-mazurskie or łódzkie.

Another cause of physicians’ emigration is deteriorating situation of public hospitals. Founding bodies for health care facilities operating in the public sector are mainly government bodies and local universities or medical (clinical unit). Although the Act does not specify the rules for the distribution and use of public funds by both providers, in fact, the public sector is favored when contracts. One of the most serious problems of the system since the reform of 1999 is a multidisciplinary hospital debt. Their debt consists of 90% of debts of all public health care facilities. The primary cause was the so-called “over limit realization services” - services rendered over the contracted limit of NHF, for which the NHF did not pay [21]. Other factors contributing to the result of the already mentioned failure is the ownership status and lack of supervision of the actual their activity. Hospitals do not always manage effectively, as well as unsuccessful taken investment. Hospitals’ debt and each year reduction of annual contracts by the NHF for public health is the main reason for seeking alternative earnings sources by professionals. For this reason, in the wealthier areas of Poland occurs the transfer of specialists from the public sector to the private sector which offers much better conditions. Paradoxically, this situation is inspired by the current health care system in Poland. On the one hand, we have poorly paid medical specialists in public health care and limited health care contracts.
Life satisfaction and its dependence on the diversity of socio-economic development and accessibility to public healthcare

by the NHF and on the other hand, the private sector, which fills the gap of the medical services created as a result of the NHF activity, but still too expensive for regular citizen. Moreover, one of the most important problems of the Polish system is the low level of funding. In the period 1990-2007 the share of public expenditure in general expenses decreased from 92% to 70.8% [22].

The right to health is one of the basic human rights and is, as such, guaranteed by the Constitution of the Republic of Poland. Therefore, greater commitment from of all the stakeholders is required to uphold that right and it shouldn’t be closely connected with financial sources only. To increase the number of physicians, it is necessary to offer some incitements for medical students and young physicians, such as the existing salaried internship and residency programs or solution to the housing problem. However, due to significant differences between counties, the incentives should be tailored to the needs of a specific environment rather than applied uniformly to all regions.

CONCLUSION

Greater satisfaction with the health status of the inhabitants of the southern provinces is registered. A weak negative correlation with the level of socio-economic development and a positive correlation with the index of access to public healthcare service, do not allow for an unambiguous estimate of the influence of taken factors, on the level of satisfaction of residents from the health aspect of their life, because they are not statistically significant. The obtained results indicate that this test should be performed on smaller territorial units (NUTS-3). However, to get the data for the calculation of both HDI and TMA for these areas can pose significant difficulties or be downright impossible. This can occur because the statistical office does not publish the relevant data for such areas.

ACKNOWLEDGMENT

The opinions set forth are opinions of authors, not the official attitudes of their institutions.

REFERENCES

ABSTRACT

The main aim of this paper is to examine the impact of the socio–economic development and regional diversity in access to public healthcare in Poland on the population satisfaction from health aspect of their life. Voivodeships were divided into four groups, using quartile method, according to the access to public healthcare in Poland and socio-economic development level. Socio-economic development level was identified by the Human Development Index (HDI) for each voivodeship. Disparities level to access to the public healthcare was identified by taxonomic measure of accessibility (TMA). Health satisfaction index (HSI) was compared in the different regions, depending on the level of HDI and TMA index. The study of correlation between HSI and HDI, and TMA gave a negative result. At the same time it was explained, that the relationship of health satisfaction and accessibility to public health and socio-economic development, in each tested region is non-linear. A larger proportion of people satisfied with the state of his health reside in the southern provinces. Irrelevance of HSI correlation with the level of socio-economic development and the indicator of access to public healthcare services may be due to disparities inside each region. It is advisable to carry out research in areas smaller than the voivodeship - (NUTS -3).

STRESZCZENIE

Celem niniejszej pracy jest zbadanie wpływu rozwoju społeczno-gospodarczego województw oraz regionalnego zróżnicowania w dostępie do publicznej służby zdrowia na zadowolenia mieszkańców z punktu widzenia zdrowotnych aspektów ich życia. Województwa zostały podzielone na cztery grupy, zastosowaniem metody kwartyli, wg dostępu do publicznej służby zdrowia w Polsce oraz pod względem poziomu rozwoju społeczno-gospodarczego. Poziom rozwoju społeczno-gospodarczego został zidentyfikowany przez wskaźnik Human Development Index (HDI) dla każdego województwa. Różnice poziomu w dostępie do publicznej opieki zdrowotnej zostały zidentyfikowane poprzez zastosowanie taksonomicznej miary dostępności (TMA). Indeks satysfakcji Zdrowia (HSI), określający procent osób powyżej 16 roku życia, zadowolonych ze swojego zdrowia, porównano w różnych regionach w zależności od poziomu HDI i wskaźnika TMA. Badanie, korelacji pomiędzy HSI i HDI oraz TMA, dało wynik negatywny. Jednocześnie wyjaśniono, że zależność zadowolenia z aspektu zdrowotnego a dostępnością do publicznej służby zdrowia oraz rozwojem społeczno-gospodarczym każdego badanego regionu nie ma charakteru liniowego. Większy odsetek osób zadowolonych ze stanu swojego zdrowia zamieszkuje w województwach południowych. Nieistotność korelacji HSI z poziomem rozwoju społeczno-gospodarczego oraz ze wskaźnikiem dostępu do publicznej służby zdrowia, może być spowodowana zróżnicowaniem wewnątrz województw.
Wskazane jest przeprowadzenie badań na obszarach mniejszych niż województwa - (NUTS-3).

*Artykuł zawiera 23714 znaków ze spacjami*