Regional mortality in Slovakia
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Chapter 8

Discussion

This study was carried out in order to assess the regional distribution of specific types of mortality by age, period, area level and cause (alcohol) and to examine the association between these types of mortality and selected socioeconomic indicators (educational level, unemployment, income and the recipients of material need benefits) and ethnicity (Roma population). This final chapter provides a summary of the main findings of this study and a discussion of the main findings in the context of what is already known from research in this field. In addition, the strengths and limitations of the study are reviewed and implications for future research and for public health practice are addressed.

8.1 Main findings

Research question 1 (Chapter 3):

Are socioeconomic indicators and ethnicity of the population associated with the geographic distribution of mortality of the population aged 20-64 years by gender in the districts of the Slovak Republic?

Socioeconomic differences in regional mortality were found among males aged 20-64 years and are predicted by a lower proportion of males with tertiary education and a higher male unemployment rate in the particular district. The average monthly gross income and the proportion of the Roma population did not contribute to this prediction. Among females, the proportion of females with tertiary education, the female unemployment rate, the average monthly gross income and the proportion of the Roma population did not predict the differences in standardised mortality rate between districts.

Research question 2 (Chapter 4):

Are socioeconomic indicators associated with the regional differences in mortality in the population aged 20-64 years by gender in the districts of the Slovak Republic and did the strength and trend of this relationship change during a 10 years period?

In males income and the proportion of inhabitants in material need were both significantly associated statistically with a higher standardised mortality in both periods, while in females, only the proportion of inhabitants in material need was associated with a higher standardised mortality in both periods. The unemployment rate did not contribute to this prediction in either gender or either period. The adjusted model showed that the proportion of inhabitants in material need was the most important economic indicator associated with the mortality rate among districts in the Slovak Republic in the population aged 20-64 years for both genders.
Research question 3 (Chapter 5):
Are area and individual socioeconomic indicators and ethnicity associated with the urban mortality in individuals aged 20-64 years in the two biggest cities of the Slovak Republic?

The proportions of Roma and of those with low education per area were associated with higher mortality of the population aged 20-64 years in both of Slovakia’s two biggest cities. The proportion of inhabitants with a high education, the average monthly gross income and the unemployment rate of an area did not contribute to the prediction of mortality. The mutually adjusted model showed that the proportion of Roma per neighbourhood was the strongest predictor of the standardised mortality rate in these urban populations.

Research question 4 (Chapter 6):
Are socioeconomic indicators and the ethnicity of the population associated with the geographic distribution of perinatal and infant mortality in the districts of the Slovak Republic?

All of the explored socioeconomic indicators (educational level, unemployment rate, income) except income and ethnicity (the proportion of the population living in Roma settlements) individually contributed significantly to both perinatal and infant mortality. In the model exploring the influence of these variables together on perinatal and infant mortality, only the proportion of Roma population remained significantly associated with higher mortality of both types.

Research question 5 (Chapter 7):
Are socioeconomic indicators and the ethnicity of the population associated with the geographic distribution of alcohol-related mortality in those aged 20-64 years by gender in the districts of the Slovak Republic?

The unemployment rate and low education appeared to be important determinants of regional alcohol-related mortality, while the proportion of Roma and income were not significantly associated with alcohol-related mortality among males in Slovak districts. Using tree analyses, the unemployment rate was assumed to be the strongest predictor of male alcohol-related mortality in the districts of the Slovak Republic, while for females such an analysis could not be performed, indicating that the selected indicators did not contribute to the explanation of the differences in alcohol-related mortality among females.

8.2 Discussion of the main findings

The main findings are discussed here within the framework of the general aims formulated in Chapter 1. Firstly, we will focus on the issue of regional disparities and the main factors of differentiated regional development in the Slovak Republic. Secondly, we will point out the differentiation of socioeconomic indicators and regional mortality in the Slovak Republic and the impact of these selected socioeconomic indicators on regional mortality. Finally, we will discuss the most important findings regarding the Roma population, their health behaviour and influence on the mortality of the population.
Regional disparities in the Slovak Republic

In our study we focused on regional disparities in mortality (one of the two most important population reproduction processes) as an outcome variable and on selected socioeconomic indicators and ethnicity in the Slovak Republic. The results of the study show significant regional differences in mortality by age and by gender as well as substantial socioeconomic and ethnic disparities in the Slovak Republic. The issue of regional disparities is a subject much discussed in different spheres of society; it is one of the most serious social problems not only in Slovakia, but also in a broader European context (Mackenbach et al., 2008; Mackenbach 2006). The countries of Central Europe have undergone and are still undergoing a complex and multilateral process of important qualitative changes that affect the core of society and its social-spatial organization (Gajdoš, 2008). Accompanying these changes in the Slovak Republic was also a strong change in demographic trends, which may be interpreted as a transition to a new model of reproductive behaviour (Vano et al., 2009).

As we found in our study, the mortality rate and selected socioeconomic indicators and ethnicity are strongly differentiated spatially in the regions of the Slovak Republic. Slovakia is known as a country with substantial regional disparities in different forms, the most visible of which are historical, cultural, economic and demographic disparities (Vano and Mészáros, 2004). Differentiated regional development of the Slovak Republic before 1989 is conditional by many important factors, mainly by factors of the settlements hierarchy, the macro-spatial attractiveness (west-east gradient), the transport infrastructure, the nature of settlements, the (unfavourable) economic specialisation of some regions and the specialties of the demographic structure (mainly the Roma population) (Korec, 2005). The high regional differentiation is reflected in economic and human potentials, in the highly differentiated educational level, the unemployment rate, deployment jobs, within the standard of living, but also in technical and social infrastructure (Korec, 2009; 2005; Gajdoš and Pašiak, 2006; Vano and Mészáros, 2004). The spontaneous result of the development of the regional structure of the Slovak Republic in the period after 1989 is a two-level regional polarization (Korec, 2005). The first level is the significant polarization of the extremely developed region of Bratislava (the capital city) on one side and the other territory of the Slovak Republic on the other side. The second level is the significant polarization of West Slovakia and regions of big cities on one hand and East Slovakia and the southern part of Central Slovakia on the other (Korec, 2005). The results of our study are in line with both levels of the regional polarization, mainly the second level, where we found a substantial polarization of higher mortality and socioeconomic indicators and ethnicity in the region of East Slovakia and the southern part of Central Slovakia.

Socioeconomic indicators and mortality

The results of our study refer to the significant relationship between regional mortality of the population aged 20-64 years and the educational level, unemployment rate and poverty of the population (expressed by the proportion of inhabitants in material need) in the Slovak Republic in all of the monitored years. These relationships are stronger among males. In Chapter 4 we also showed that the gap in regional mortality in Slovakia and also in socioeconomic indicators changed significantly during the
subsequent ten years. These changes most seem related to regional social and economic development of the Slovak Republic.

As we showed in Chapter 4, there is a significant differentiation of regional mortality in the districts of the Slovak Republic. The districts with the highest mortality rate are in the southern part of Central Slovakia and in East Slovakia. These regions are also characterised by a high unemployment rate, low income, and lower average educational level; furthermore, people from these regions are at greater risk of poverty (Matlovic and Matlovciva, 2011; Korec, 2009; 2005; Vaňo and Mészáros, 2004). Thus, it seems that all of the selected socioeconomic indicators examined are to a certain degree interdependent. All of these indicators – a high unemployment rate, an unfavourable educational level, a high economic burden of the population – are typical for the regions lagging behind and all of these lagging regions are characterised by a specific reproduction pattern of its population (Vaňo and Mészáros, 2004). The reproduction behaviour of the population of the Slovak Republic resembles that of developed countries (low fertility rate, low mortality rate), but in contrast, the population of the lagging regions have a reproduction behaviour typical for developing countries – a high fertility rate and also a high mortality rate. The rate of segregation of the population grows with a falling living standard, and furthermore, differences in reproduction behaviour between both groups are also growing compared with the average numbers in the Slovak Republic (Vaňo and Mészáros, 2004). In this context, districts in these lagging regions show a significantly higher mortality rate, with large differences in infant mortality rate (Vaňo and Mészáros, 2004).

From the results of our study, it is clear that for the Slovak population the greatest risk factor for mortality is a rising unemployment rate in combination with lower education level and high poverty of the population (inhabitants in material need). Interrelations among these three indicators are important; they influence mortality separately and also together, but they also influence each other in the regions. The lower level of education is directly connected with a higher unemployment rate and with a higher risk of poverty (Korec, 2005). In the European view, the long-term unemployment rate is particularly high for the Slovak population (Eurostat, 2012). Unemployment is one of the important preconditions for socio-pathological behaviour, mainly alcohol consumption. If the regional unemployment rate rises above 20%, the regional alcohol-related mortality rate also markedly rises (Chapter 7). We also found that the differences in socioeconomic indicators and in regional mortality in the Slovak Republic are much more pronounced for men than for women.

As was mentioned above, regional differentiation of the Slovak Republic is conditioned by many important factors. Our findings regarding the importance of the selected socioeconomic indicators in relation to health and to regional mortality are in line with the results of previous studies (Matlovic and Matlovciva, 2011; Korec, 2009; 2005; Vaňo and Mészáros, 2004). The most important factors acting on the increase in the unemployment rate, the decrease in the average educational level and on the growth of risk of poverty are those of the settlements hierarchy in combination with the character of the settlement, macro-spatial attractiveness (west-east gradient) and the (unfavourable) economic specialization of regions (Korec, 2009; 2005). Factors regarding the settlements hierarchy and the character of the settlement focus on the significant social and economic potential of the big cities (mainly the capital city). Big cities have better social and technical infrastructure and a favourable demographic (mainly educational) structure. In addition, big cities and their surroundings form
relatively strong regions with a higher concentration of the population and with a more differentiated labour market and less unemployment (Korec, 2009; 2005). In this context the territory of the Slovak Republic can be divided into two parts – the north-western part, with a relatively high number of big cities, and the south-eastern part where big cities are absent (there are only two big urban concentrations – Košice and Prešov). Factors regarding macro-spatial attractiveness (the west-east gradient) underline the location of the Slovak Republic. Slovakia borders only one economically developed country (Austria), and the length of that common border is relatively small. Regions of the Slovak Republic closer to the west state border had after 1989 better conditions for social and economic development compared with regions in the east. Factors related to the (unfavourable) economic specialization of regions are directly connected with factors of the settlements hierarchy – ranging from the biggest cities to the smallest villages – and the character of the settlement – the urban or rural character of settlements in the region. In regions with a combination of small cities and an agricultural orientation of settlements an extremely unfavourable economic situation is present. The regions affected by these factors are located in the southern part of Central Slovakia and in East Slovakia, and they are characterised by a higher unemployment rate directly related with a higher risk of poverty (Korec, 2009; 2005).

The results of our study also showed a significant gender differentiation in socioeconomic indicators and mortality in the Slovak Republic (Chapters 3, 4 and 7). Many European spatial studies are in line with our finding that a relationship exists between socioeconomic indicators (education level, income, unemployment) and the health and mortality of the population, and does so in regard to gender differentiation as well (Gallo et al., 2012; Health statistics – Atlas on mortality in the European Union, 2009; Backlund et al., 2007; Borrell et al., 2007; Rognerud and Zahl, 2005; Bossuyt et al., 2004; Bopp and Minder, 2003; Osler and Prescott, 2003; Muller, 2002; Kunst and Mackenbach, 1994; Sobotík and Rychtaříková, 1992). Concerning the socioeconomic indicators in the districts of the Slovak Republic, noticeable differences can be seen between males and females. The proportions of the socioeconomic indicators for males have a wider range between districts than for females. Unemployment among females is artificially reduced by household work or maternity and parental leave, which lasts for three years in the Slovak Republic. Furthermore, it has been found that females experience their unemployment less negatively than males, which could lead to lower mortality rates for females. Stress as a risk factor for cardiovascular diseases is possibly more pronounced in males than in females (Gerdtham and Johannesson, 2005; Artazcoz et al., 2004; Fukuda et al., 2004a; Skrabski et al., 2003; Waters and Moore, 2002). Income may be a better indicator of men’s material conditions, as their incomes generally comprise the greater part of a household’s purchasing power. Females also seem more resilient to risk-taking behaviour; they smoke and drink alcohol less often than males. In every culture studied, males are more likely than females to drink at all and to drink more when they do, and the gap is greater for riskier behaviour (Kovács, 2008; Mészáros, 2008; Zatonski et al., 2008; Herttua et al., 2007; Vrana, 2007; Anderson and Baumberg, 2006; Mustard and Etches, 2003; Rehm et al., 2003; Hemstrom, 2002; Harrison and Gardiner, 1999; Mackenbach et al., 1999). Also, the range of standardised male mortality rates among the districts of the Slovak Republic is markedly different from female mortality. Women are characterised by much lower values for mortality, and their range is lower as well. The influence of particular socioeconomic factors on female mortality rate is therefore less striking.
The results of our study showed that the proportion of the Roma population is the strongest predictor of regional perinatal and infant mortality in the Slovak Republic and of urban mortality in both of Slovakia's two biggest cities, but not of the general mortality of the population aged 20-64 years in the Slovak Republic.

Children are a very important part of the Roma population. The proportion of children (0-14 years of age) in the total Roma population is very high, and the highest proportion of Roma children within all European countries has long been in the Slovak Republic (36% children in the total Roma population in the year 1999) (Vaňo and Haviarová, 2003). The mortality of the Roma population is considerably higher when compared with the total population; life expectancy at birth for Roma, according to estimates for year 2010, is lower than for non-Roma populations by 7.5 years for males on average and 9.5 years for females in the Slovak Republic (Vaňo, 2002). The least favourable situation is present in the field of infant mortality, where there is a 2-fold higher mortality rate in Roma compared with non-Roma (Vaňo and Haviarová, 2003). In addition, Dostal et al. (2010) found higher morbidity (incidence of bronchitis, pneumonia, viral diseases, otitis media, influenza and intestinal infections) in Roma children 0-2 years of age compared with non-Roma children. Worse birth outcomes (shorter gestation length, lower birth weight) among Roma in comparison with non-Roma mothers have been found in Slovakia (Rimarova et al., 2004; Šaško, 2003), Czech Republic (Rambouskova et al., 2009; Bobak et al., 2005), Hungary (Joubert, 1991) and Spain (Sola et al., 2008).

Several hypotheses can be identified in the literature that may explain the worse health of the Roma compared with the majority population (Bastos et al., 2010; Peters et al., 2009; Dressler et al., 2005; Wilkinson and Marmot, 1998). These are: (1) the observed differences in health may be due to differences in living conditions, different access to goods and services and the extent of poverty, meaning the major cause of these differences is not ethnicity but differences in socioeconomic characteristics. There are studies confirming the contribution of socioeconomic characteristics in the explanation of health differences between Roma and non-Roma (Kolarcik, 2012; Vokó et al., 2009). (2) Cultural differences are the cause of differences in health literacy, in health-related behaviour (nutritional habits, use of psychoactive substances, physical activity, disease prevention), which lead to gaps in health (Ostrihonova and Beresova, 2010; Vivian and Dundes, 2004). (3) The psycho-social hypothesis points to the health consequences of stress from discrimination, social exclusion, material and financial deprivation and lower socioeconomic position (Wiliams and Mohammed, 2009). Finally, (4) the conditions in early childhood may be a disadvantage, and this disadvantage tends to cumulate in each subsequent critical life period, which may result in widening differences in health over life, resulting in a shorter life expectancy (Wilkinson and Marmot, 1998). Of particular interest is access to health care, which might be an important factor regarding infant mortality. Available indicators of health care (the number of gynaecologist and the number of beds for institutional care per region) did not contribute to the explanation of regional disparities in infant mortality, perhaps because these indicators measure only the physical availability of health care facilities. Despite the fact that there is a free access to health care guaranteed by law and access to health care in a particular region, several significant barriers may exist to benefiting from health care from the side of the Roma population; these include residential segregation (distance from health care facilities and obstacles to arranging
a visit), low health literacy, prejudices and discrimination (Popper et al., 2009).

As was mentioned above, regional differentiation in the Slovak Republic is also determined by the particularities of demographic structures regarding biologic, economic and cultural characteristics (mainly the Roma population) (Korec, 2005). The significant determinants of the characteristics of the Roma population are regional factors and factors regarding integration. Roma live across the whole territory of the Slovak Republic; nevertheless there are large differences in their number, concentration and reproductive behaviour in different regions (Vaňo and Haviarová, 2003). The regions with the highest proportion of the Roma population are located in the southern part of Central Slovakia and in East Slovakia and correspond with the regions with an unfavourable socioeconomic structure (Korec, 2005). The Roma population is disadvantaged by lower education levels and greater illiteracy, which represent a major barrier to successful involvement in the labour market (Filadelfiová et al., 2006).

**Summary of findings**

All relations described in the previous text are depicted in the model in Figure 8.1. In our study we found a significant relationship between selected socioeconomic indicators and ethnicity and regional mortality of the population in the Slovak Republic. We showed that this interrelation of socioeconomic indicators and mortality is strong for males aged 20-64 years. The proportion of Roma population is the strongest determinant of infant mortality.
Figure 8.1 – Model of the effects of the selected socioeconomic indicators and ethnicity on the mortality rate as found within the thesis.
DISCUSSION

Regional mortality in Slovakia: socioeconomic indicators and ethnicity

8.3 Strengths and limitations of the study

The most important strengths of this study are the area-based design, age specification of the population and the over-time perspective. In many countries, individual-based data on mortality by age are not available, whereas area-based data are mostly available and comparable. Using an ecological design, the study is strongly related to the continuous availability of data at the area level, in contrast with those at the individual level. An ecological study uses data that generally already exist and is a quick and cost-efficient approach compared with individual level studies. It is also particularly valuable when an individual level association is evident and an ecological level association is assessed to determine its public health impact.

Focusing on a lower geographical level (e.g. areas, regions, districts) seems to be more accurate than country comparisons or state level analysis, but studies based on sub-national entities are less common (Ginter and Hulanska, 2007; Kosa et al., 2007; Tobiasz-Adamczyk et al., 2007; Watson, 2006; 1997; Domínguez-Berjón et al., 2005; Materia et al., 2005; Rognerud and Zahi, 2005; Blomgren et al., 2004; Fukuda et al., 2004a; 2004b; García-Gil et al., 2004; Lopez, 2004; Skrabski et al., 2004; 2003; Bopp and Minder, 2003; Deaton and Lubotsky, 2003; Muller, 2002; Dzúrová, 2000). Some of these studies focus only on an analysis of a given area and do not include a spatial comparison between them (Tobiasz-Adamczyk et al., 2007; Watson, 2006; 1997). Every country has its own specific ‘circumstances’ and these regional studies are necessary. In the Slovak Republic there is a lack of studies focusing on spatial analysis of mortality, health and socioeconomic indicators on a lower geographical level (Ginter and Hulanska, 2007).

A further strength of our study is its use of the combination of area and individual data at a small area level. Multilevel analysis provides a way to link the traditionally distinct ecological- and individual-level studies and to overcome the limitations inherent in focusing on only one level.

However, this study has also some limitations. One is the deficient database regarding income (average monthly gross payment), which is available only for companies with 20 or more employees at the district level in Slovakia. The proportion of such enterprises is about 60%, although the total number of enterprises cannot be determined due to the lack of available data. Its determination is further impaired with decreasing size of the territorial units assessed. This phenomenon probably explains the lack of significance in our results regarding the relationship between income and regional mortality rate in the districts of the Slovak Republic. It would be very interesting to identify income as a variable which also includes data from small enterprises and to use it in a similar analysis to mortality rate, as is done in this study. Due to the deficient database regarding income this is currently not possible.

A second limitation of our study is the lack of complete data on the proportions of the Roma population. In our study we used data from two sources – the population with self-declared Roma ethnicity (Chapters 3 and 5) from the national population census (Population and Housing Census 2001, 2008) and the proportion of the population living in Roma settlements (Chapters 6 and 7). Data from the national population census are based on self-identification, in which everybody may freely claim his own ethnic background. This official census is assumed to underestimate the real numbers of Roma people due to the tendency of Roma to denote themselves as members of more positively-assessed ethnic groups (Kolarcik, 2012). The definition of the population living in Roma settlements did not include the whole variety of the

DISCUSSION 117
Roma population; it did not include the Roma population living in cities nor those integrated with the majority population.

8.4 Implications

Implications for practice

Based on the findings of this study several implications for public health practice arise. Over the last decade major developments in public health policy have become apparent in a number of societies. The traditional focus on improving the population's overall health has been widened to include a commitment to reducing health differences between population groups (Graham, 2004). In the Slovak Republic several policies and strategies exist that focus on health, mortality, reducing regional differences and on the studied variables. The implementation of these policies and application of the laws in practice is very important. For example, the State Health Policy of the Slovak Republic includes four fields of priority (chronic diseases, infectious diseases, environment and health, tobacco and alcohol), but does not focus on regional disparities. Only in the field of cardiovascular health is it a priority to pay special attention to regions with lower social development, since most cardiovascular risk factors, including significantly higher mortality, occur in such areas and especially in lower age groups. Mortality and regional inequalities should be a subject of policies in several sectors, and cooperation between these sectors at all levels (national, regional and local) is needed. The formation of the Central coordinating council for health protection and promotion of the Slovak Republic in the year 2011 should help in this regard.

The important concerns are currently labour market policy, education policy and income policy; some social reform is also in progress with an impact on senior citizens (pension reform). These policies focus on individual groups within the population with regard to the given issues; they are not focused on regions as entities, but it might be expected that the combined effects of such policies will contribute in the end to reducing regional differences in mortality. Our findings can also be used in the development of social policies which preferably increase employment in regions with the highest proportion of inhabitants in material need, since probably only surveys, suitable policies and interventions will be able to “revitalise” regions at risk. Such a redistribution of parts of the government over the country could contribute to a reduction in the proportion of inhabitants in material need and thus reduce the standardised mortality in such regions.

There is a lack of a well-developed family policy with support for the function of the family and services for families in the Slovak Republic. In addition, the interconnectedness of the educational system with the labour market is weak. Furthermore, policies focusing on better solutions for problems of the Roma population and their integration in society are still underdeveloped. Our findings stress the importance of integrated regional policies (education policy, employment policy, income policy, social policy, health care policy) to reduce the regional disparities in mortality. In the field of Roma issues, ‘The strategy of the Slovak Republic regarding the integration of Roma communities up to 2020’ already exists. The goal of the ‘Strategy’ is to target the removal of forms of social exclusion of Roma, such as Roma
Regional mortality in Slovakia: socioeconomic indicators and ethnicity

communities and marginalized Roma communities, with economic, cultural, symbolic and spatial exclusion compared with the non-Roma population. The European Commission assesses this policy positively, but its implementation in practice will be important, if not decisive (Van Dijk, 2008). In all of the mentioned fields a thoroughgoing implementation of policies is necessary as is a careful assessment of the effectiveness of these policies by setting realistic and measurable indicators and their subsequent strict monitoring and evaluation.

It is also important to address the health needs of deprived urban areas in the Slovak Republic. These needs may be met by approaches as described by the commissioner on socioeconomic health differences (Commission on Social Determinants of Health, 2008). In addition, it is also important to consider interventions aimed at a revitalisation of all areas facing structural difficulties, such as those proposed by the EU Structural Funds.

In the field of infant and perinatal mortality, there are several measures which have the potential to decrease differences. The first measure that should be mentioned is supporting the work of community health workers and stimulating the collaboration between community health workers, paediatricians and gynaecologists with the aim of overcoming the institutional barriers in the field of mother and child care for women living in Roma settlements (Peters et al., 2009; Rechel et al., 2009; Kosa et al., 2007). Secondly, establishing an intensive and long-term health promotion programme for adolescent Roma women focused on reproductive health, prenatal care, parenting and family planning (Bobak et al., 2005) is important. A rather unorthodox idea might be the use of financial stimuli (e.g. making the receipt of certain social benefits dependent on participation in prenatal care) to stimulate participation in prenatal care (Rambouskova et al., 2009). Finally, enhancing access to the health care and the social services systems with the aim of ensuring adequate immunisation, early treatment for ill children and social support for vulnerable children (Dostal et al., 2010) should have a fair chance.

Most alcohol-related mortality in the new member states of the European Union could be reduced if alcohol control policies known to be both effective and cost-effective were not merely formulated but also implemented. Stressing the social unacceptability of binge drinking, protecting young people against alcohol (the consequent application of the law on the prevention of alcohol abuse), protecting people other than the drinker (the consequent application of the law and restrictive measures – restrict or prohibit the sale of alcohol, increase in excise duty on alcohol, higher penalties for drunk driving) and mobilizing public support so that help is available for people with problems are all among recommendations for alcohol policy. However, such policies require changes in the approach towards alcohol, creating challenges for societies and consequently for governments (Zatonski et al., 2008).

In the Slovak Republic, in contrast to legislative steps taken in recent years leading to a restriction on smoking in public and to health protection of non-smokers, in the field of the alcohol consumption effective actions that would have a positive impact on the health of inhabitants are still lacking. The implementation of the existing age restriction to buy alcohol (>18 years) would be among the first policies to implement; and since alcohol is cheaper than soft drinks, politicians should consider a tax instrument to be used in the fight against avoidable alcohol-related mortality.
Implications for future research

Our study is a spatial analysis of differences in mortality in the relationship with socioeconomic indicators in a particular period in the Slovak Republic. The results indicate the need for more and deeper studies into mortality by gender and age, its geographical distribution and the socioeconomic factors that increase its level. The factors that were analysed in this study still create a prerequisite for further exploration of this field. In future research it is important to explore the different pathways in the distribution of socioeconomic indicators and mortality by gender and to focus on the excess male mortality related to the unfavourable socioeconomic characteristics of males.

As has already been mentioned in the limitations of the study, statistics from the Slovak Republic are deficient in regard to income. In addition to examining the overall level of income it would be appropriate to consider income inequality within a region and through the Gini coefficient, similarly as in studies carried out previously (Leigh and Jencks, 2007; Thorbecke and Charumilind, 2002).

Findings in the field of urban mortality in the Slovak Republic are new and thus require confirmation in other Central European countries to check whether our findings are country-specific or whether they fit into a pattern that extends over multiple countries. Moreover, urban mortality should be analysed in relation to other health and socioeconomic factors (like social class, regional GDP and the regional Gini-index), as well as trends that occur over time.

Further research of infant mortality might attempt to reveal the mechanisms that play a role in causing socioeconomic differences in infant mortality. Different access to health care between the Roma and non-Roma population, different quality of health care provided, health literacy, health-related behaviour and many other factors might contribute to the explanation of the differences in infant mortality, while on the other hand, a better understanding of these processes might help us to formulate tailored, evidence-based interventions. Special attention should be paid to the differences in accessibility of offered services.

Our results on regional differences in alcohol-related mortality indicate a great need for continuation with further analyses of alcohol-related mortality and its determinants. In a follow-up study, alcohol-related mortality should be analysed in relation to other socioeconomic factors such as social class, regional GDP and the regional Gini-index. Furthermore, it would be interesting to study how the relationships between alcohol-related mortality and separate socioeconomic factors change over time.

8.5 Conclusion

Socioeconomic indicators, such as education, unemployment or poverty, significantly contributed to regional differences in mortality in the Slovak Republic. Male population seems to be more vulnerable to their effect, particularly in case of alcohol-related mortality and in the case of unemployment. The unemployment rate (also as an accompaniment of the economic crisis) is strongly associated with alcohol-related mortality, which is a major contributor to the shorter life expectancy not only in Slovakia but also in other Central and East European countries. Economic growth between the periods 1997 – 1998 and 2007 – 2008 combined with the investment
Regional mortality in Slovakia: socioeconomic indicators and ethnicity

of European structural funds to the new EU member states contributed to the improvement of the socioeconomic situation in many districts in the western and northern part of Slovakia, though some districts in the south-east part of the Slovak Republic remained “poor” in terms of the proportion of inhabitants in material need, which significantly contributed to the regional differences in standardised mortality rate. A significant group of the population at risk consists of Roma living in settlements. The proportion of Roma is the strongest predictor of regional perinatal and infant mortality in the Slovak Republic and of urban mortality in Slovakia’s two biggest cities and represents a significant regional development challenge not only in the Slovak Republic. Developing and implementing policies aimed at reducing socioeconomic inequalities in mortality and addressing the health needs of the most deprived groups and the most deprived areas seems to be important for the further economic development of the country. The proportion of inhabitants in material need was the most important economic indicator associated with the mortality rate among districts in both explored periods (1997–1998 and 2007–2008). Attention should therefore be paid on the population at risk – in the case of Central and Eastern Europe mainly the population living in Roma settlements – and successful strategies and tools (e.g. Roma mediator) and their long-term sustainability should be considered. Finally, there is a need for an audit of existing routine datasets with regard to their capacity to be used for a health equity surveillance system, indicating groups of population at risk as well as areas at risk and evaluating the effect of measures applied for the reduction of regional disparities in health.
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