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Arnela Ahmić

SOCIOECONOMIC INEQUALITIES IN HEALTH OUTCOMES IN THE BALKANS: A SYSTEMATIC REVIEW

Diploma thesis

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1. INTRODUCTION

Socio-economic inequalities and its association to health is a major field of research. Within a society, unequal distribution of resources leads to advantage among groups of higher social class, with the effect of inequalities on health outcomes, where groups of lower socio-economic status have higher morbidity and mortality (1). The relationship between low socio-economic status and increased morbidity and mortality is well established (2-6) as is the other side of the spectrum, i.e. high socio-economic status has been shown to be significantly associated to reduced mortality and morbidity (7-9).

1.1 Definition of socio-economic status

Various methods have been used to gather data and measure socio-economic impact on health, and various types of socio-economic conditions have been defined in the attempt to understand how these conditions are related to health outcome.

In the late 90's the European office of WHO requested a set of guidelines for the measurement of socio-economic inequalities in health. The request was especially asked to enable monitoring of changes over time. During the work of creating such guidelines, a clearer definition of which socio-economic factors to measure also became adopted (10).

Socio-economic status (SES) is today regularly defined by and divided into three categories: education, occupation, and income (1,10,11).

1.1.1 Education

Education, as a measure of socio-economic status, is categorized into 5 levels; *no education*, *primary education*, *lower secondary education*, *higher secondary education*, and *tertiary education* (1,10,12). Since there are substantial differences between countries and different schooling systems, education can also be measured or expressed as a numerical variable, namely as the completed years of schooling. This approach may allow for direct comparison of results from different countries and different schooling systems.

1.1.2. Occupation

Occupation is sometimes divided into manual and non-manual 'type', where manual is considered the lower level (1). Other times, occupation is categorized into more specific groups, such as upper and lower white collar, blue collar, farmers (10). Ultimately, person's occupation can be based on person's educational background, i.e. a baker or a banker or a nurse.

1.1.3. Income

Income is measured in absolute numbers, but several weaknesses in regard to the measurement of income are theorized, which will be clarified in the section discussion. These weaknesses include: black economy, unpaid work by stay-at-home-parents, the bluntness of GNP and GDP.

1.2. Measuring the effect of socio-economic status

Methods of measuring socio-economic inequalities in health are numerous (10). Several comparative studies have had drawbacks, and over the years, attempts have been made to systematically develop a set of possible measures to create a basis for reliable and comparable data (10,11).

The measurements of socio-economic status impact focus on measuring *effect* and *total impact*. There are four ways to measure effect and eight ways to measure total impact (10). Measures of effect are: *rate ratio of lowest versus highest SES group, rate difference of lowest versus highest SES group, regression-based relative effect index, regression-based absolute effect index.* Measures of total impact are: *Population-Attributable Risk (PAR), Population-attributable risk (absolute versions), regression-based population-attributable risk, Index of Dissimilarity (ID), Index of Dissimilarity absolute version, Relative Index of Inequality (RII), slope index of inequality* (10). The measures use rate ratios and rate differences, as well as simple and complex indices. They compare different SES groups as well as look at differences within those groups, and by using several measures for the same analysis, the reliability increases, and the results yield several interesting findings (10).

Linking socio-economic status to health outcome is often done indirectly, first through mortality studies (1,10,11). By using mortality studies we are able to harvest absolute numbers in the furthest end of the spectrum of ill-health, i.e. death (1).

Mortality studies are by rule *national* (at the same time allowing us to compare international data and examine differences and similarities between countries), *longitudinal* (allowing for statistically comparable data over time with socio-economic development in a specific geographic region), and *census-linked* (securing the data being collected and recorded in equal fashion over time) (10).

Morbidity data is more often found in self-assessed health surveys, also including self-reported socio-economic data (1).

1.2.1. Other approaches in measuring the effect of socio-economic status

Human Development index (HDI) is a statistical measure of life expectancy, education and income. A country scores high in HDI when life-span, educational level and GDP are higher (13).

Standard of living refers to the level of wealth, comfort, material goods, and necessities available to a certain socio-economic class in a certain geographic area. The standard of living is closely related to quality of life and these terms should not be confused. Standard of living is based primarily on income. It is the degree by which people are able to satisfy their needs and/or their wants. Examples are access to certain goods (such as number of washing-machines per 1000 people), or measures of health such as life expectancy, or measure GDP (14).

Quality of life (QOL) is the perceived quality of an individual's daily life. This includes all emotional, social and physical aspects of the individual's life. Between two countries or regions within a country that have similar material standards of living, quality of life factors may make one of these places more attractive (15).

In recent times researchers have begun distinguishing the two aspects of personal well-being: emotional well-being and life evaluation. *Emotional well-being* denotes the quality of everyday emotional experiences, the frequency and intensity of their experiences of, for

example, joy, stress, sadness, anger, and affection. *Life evaluation* corresponds to the life in general, and it is necessary to evaluate it against a scale (15).

Health-related quality of life (HRQoL) is quality of life in relation to health, ie. an assessment of how the individual's well-being may be affected over time in the physical, mental and social domains of health. For example, the patient is able to get up, eat and drink, and take care of personal hygiene without any help from others or, the angle to which a limb could be flexed (15)

Occupational differences (in the part of measuring socio-economic status) are related to inequalities between health outcome, the same way both education and income are. White collar and non-manual occupation have a negative association with health inequalities, both increased morbidity as well as mortality (16).

1.3. Health outcomes associated with socio-economic status

Numerous data show that low socio-economic status is related to higher mortality within a population, and these findings have been repeated in many different countries, as well as in different geographic regions within countries. Thus, an apparent inequality of health outcome, is directly associated to socio-economic status (1,3,10,17,18,). Still, the impact and magnitude of this inequality varies substantially among countries and several studies show that mortality is considerably higher in less developed regions (1,3,17,19). Findings have shown that in Europe, those with lower socio-economic status, have higher rates of death from all causes, except breast cancer, compared to those with higher socio-economic status (1). In some countries, e.g. Sweden, although an inequality in mortality is noted, the factual mortality of people with high socio-economic status is less than twice of those with low socio-economic status. In other countries, e.g. Hungary, the same factual mortality difference is four times as many between those of low and high socio-economic status (1).

It is important to point out that behind this general tendency of association between the low socio-economic status and higher mortality rates, lies interesting heterogeneity. When comparing social groups, certain health outcomes may be equally distributed; more or less

prevalent; or changing over time. For example, smoking, and consequently lung cancer, used to be more prevalent among higher social class, but today we see a reverse trend. Furthermore, mortality rate due to leukemia has been shown to be equally distributed among socio-economic groups, while melanoma mortality is today higher among higher social class, presumably related to vacation trips and sun-exposure, while it used to be more prevalent among manual agricultural workers (20).

Low socio-economic status has been associated with a wide range of morbidities such as hyperlipidemia, cardiovascular disease, smoking, mental health, obesity, diabetes (2,4-6). Thus, reducing the socio-economic inequalities is an important challenge for society.

Smoking is among the largest avoidable health risk in the general population world wide. Globally, lung cancer is the most common cause of cancer death, tobacco smoke being the main etiological factor **(**21). Smoking and second-hand smoke exposure are strongly related to socio-economic status and inequalities in mortality (18,22,23). Second-hand smoke exposure has been associated with socially disadvantaged groups, at home as well as at the workplace, predominantly among low educated population (23). Studies have also shown that smoking and its impact on health is associated with gender-related inequalities in mortality. Looking at Europe as a whole, smoking- related conditions account for about ¼ (22%) of inequalities in mortality rates from any cause among men and only 6% among women (1). The situation varies among countries, where larger inequalities in mortality rates between men and women due to smoking are seen in eastern and Baltic regions, whereas findings show a smaller, even reverse situation in the southern Europe, indicating that men and women have equal, or even that women have higher rates of mortality due to smoking (1). The level of education has a clear impact on this outcome, where low education is related to high rates of smoking-related mortality (24).

The inequalities in morbidity between low and high SES groups are noticeable already in younger age groups. The association between obesity and low SES is significant, related to larger intake of high sugar beverages, fewer regular meals, and more TV time (i.e. less physical activity) among children from a low SES group (4,6).

Another strong link between low SES and morbidity is seen in the data found in research looking at the relationship between low SES and tuberculosis (TB) mortality rates. Differing strongly between countries and between education groups within countries, TB

mortality rates (where they have increased) have increased in groups with low educational levels (i.e. low SES) (5).

The association between low SES and morbidity also arises in studies that initially do not try to investigate that particular relationship, for example a study primarily investigating the association between BMI and prevalence of multi-morbidity, also reported the significant association between low education and multi-morbidity (2).

Although several studies have shown a significant association between low socio-economic status and an increase in both morbidity and mortality, some findings show a reversed health inequality, where specific illnesses and/or mortality are higher in a high socio-economic group. Such a finding has been noted in the Balkans, connected to the tobacco use. In most high-income countries, there is a decline in the tobacco use (smoking), and smoking is more common in countries that have a larger proportion of low socio-economic groups. The opposite is in the Balkans, where the prevalence of cigarette smoking was 1.8 times greater among high socio-economic group, compared to the low socio-economic group (25). Likewise, studies have shown that among the higher educated in Portugal and Greece, rates of smoking were higher (24).

As with several findings where low SES is associated with higher mortality than among high SES groups, mortality in colorectal cancer is considerably higher in less developed countries and low SES groups. Interestingly, the incidence of colorectal cancer is higher in high SES groups, compared to low SES groups (19). This finding is also seen with pancreatic cancer, with higher incidence among groups of higher Human Development Index (HDI), with a somewhat higher incidence among the male population, believed to be attributed to higher rates of smoking among males, but this association is significant among women as well (26).

In Europe, cardiovascular disease is a major cause of education-related inequalities in the rate of deaths, accounting for about ½ (51%) among women (1).

Life expectancy of the population is strongly associated with income distribution. Gain in health outcome is directly related to higher income, especially seen in countries with a more even distribution of income among the population, having better and more available

public and health-care services. Studies also showed that beyond a certain point of income the gain in health reaches a plateau, where no further improvement of health was associated with increase in income (12).

1.4. Socio-economic status in Europe: comparison between the East and the West

In Europe, the level of socio-economic inequities, i.e. education, occupation and income, differ between countries. In general, in the southern and eastern regions of Europe, the educational level of the population is generally low, as compared to the western and northern regions. Whereas, for example, inequalities in income are large in England and Wales, despite belonging to the northern part of Europe (1).

People with lower levels of education showed poorer health outcomes and higher mortality rates due to any cause throughout Europe. But, great variability of inequalities among countries was discovered. Education-related inequalities in mortality are smallest in southern regions and larger in eastern and Baltic region (1).

Another study, published in The Lancet, compared socio-economic inequalities in mortality and morbidity in Western Europe. Data presented in this article displayed very similar between-country results. Surprisingly, in northern countries, e.g. Sweden and Norway, the study showed larger inequalities in health outcome than average (11). However, differences among countries cannot be observed from a general perspective, but rather look at specific predictors of socio-economic inequality. As an example, in Nordic countries, inequalities in income-related mortality rates were very low, whereas mortality and morbidity in relation to inequalities in education and occupation was high, supporting the concept of limitations in egalitarian policies reducing overall mortality (11,12).

2. AIMS AND HYPOTHESIS

2.1 Aim

The majority of the literature findings regarding the socioeconomic status and its impact on health come from the Western Europe and other more developed countries, with scarce studies performed in the Balkans. The aim of this study was to perform the literature search for the papers on the socioeconomic status, published from the countries in the Balkans: Bulgaria, Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Romania, Serbia, and Slovenia. Additionally, we recorded the type of the socioeconomic estimate used in the study, as well as various health outcomes.

2.2 Hypothesis

1. Researchers from Croatia and Slovenia have published more papers than researchers from Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, Romania, and Serbia

2. There were more studies published in the period after 2010, compared to the 1995-2009 period

3. Education was the most common socioeconomic determinant used in the published studies

3. MATERIALS AND METHODS

This study is a systematic review study, a type of secondary study design, aiming to summarize published data in a qualitative approach.

3.1. Literature search

A detailed systematic search was performed to summarize published data related to the socioeconomic inequalities in various health-related variables in Balkan geographic area, using three databases - PubMed (http://www.ncbi.nlm.nih.gov/pubmed/), Web of Science (http://wok.mimas.ac.uk) and Scopus (http://www.scopus.com). The search was initially performed on 8 June 2016, with an update on 8 January 2018. A complex search strategy was created and consists of three parts: search terms related to Balkan countries (Balkan OR Yugoslavia OR Jugoslavia OR Serbia OR Bulgaria OR Albania OR Kosovo OR Montenegro OR Bosnia OR Croatia OR Herzegovina OR Slovenia OR Romania OR "Bosnia and Herzegovina"), search terms related to socioeconomic categories (social OR socioeconomic OR socio-economic OR material OR educatio* OR occupation OR money OR income OR wealth OR attainment OR schooling OR "quality of life"), and search terms related to inequality (trend OR estimation OR inequit* OR gap OR disparit* OR differenc* OR inequalit* OR disprop* OR heterogen*). At this stage search was not restricted to any specific health-related variable due to the large number of possibilities.

Observed period in which studies were published was set between 01.01.1995 and 31.12.2017.

All identified articles were first categorized for appropriateness as *relevant/maybe/not relevant* by two reviewers independently by assessing the title and abstract. Third reviewer made the final selection if there were any disagreements. Selected *relevant* and *maybe* articles were read in full text again by two reviewers independently and evaluated based on specific inclusion and exclusion criteria, while a third reviewer resolved any disagreements. Systematic review was conducted and written under the PRISMA reporting guidelines (27). Figure 1 shows the PRISMA flow diagram of the study.

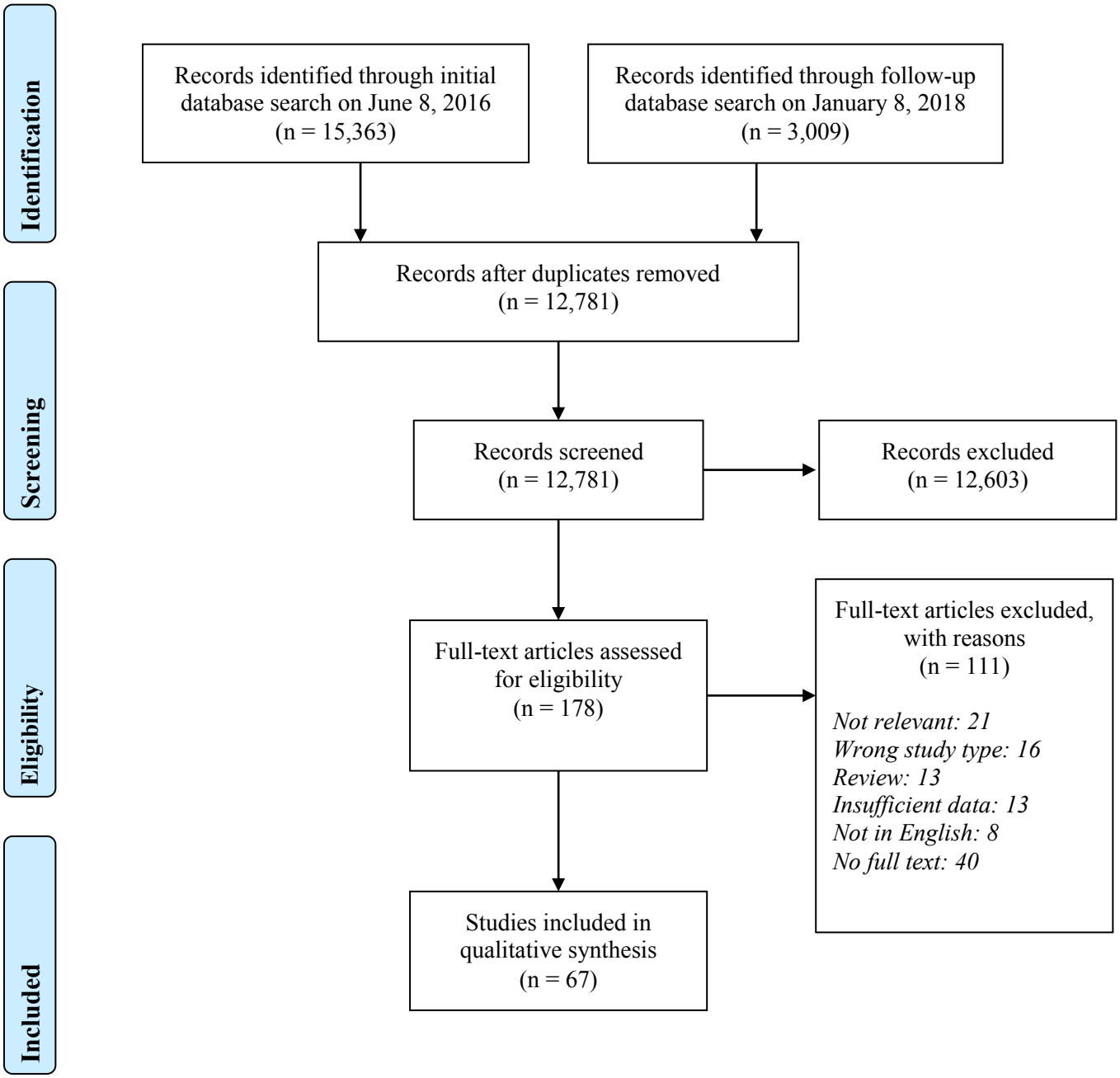


Figure 1. PRISMA flow diagram of the study

3.2. Eligibility criteria

To be included, studies had to satisfy several requirements. Firstly, studies published before 1990 and ones that were not published in the English language were excluded. Studies that assessed the impact of at least one of the socioeconomic categories (education, occupation, income, employment, self-perceived social class, wealth index, family affluence, or material status) on any health-related variable (morbidity, mortality, any disease, obesity, self-perceived health status, various health-related behaviours (smoking, nutrition, physical activity, alcohol intake), mental health, etc.) were included. Studies performed in at least one Balkan country (Bulgaria, Serbia, Croatia, Romania, Bosnia and Herzegovina, Montenegro, Slovenia, Kosovo, Albania, Macedonia) were included. Both children- and adult-based studies were included, with the difference that socioeconomic categories in children-based studies are based on parents (e.g. parental education).

3.3 Data extraction and presentation

A data collection form was developed and tested prior to starting the review. Two authors extracted the data independently and compared results afterwards. Any disagreements were resolved by a third author. Data extracted included article details (authors, title, publication year, journal name, PMID), and study details (country, sampling period, is it a children or adults study, health outcome, socioeconomic predictor, sample size and age range of participants). For studies that included data on several Balkan countries or with different socioeconomic predictors or different health outcomes, all of the models were extracted as separate entry.

Main results were synthesized as a narrative review based on the various combinations of health outcomes and socioeconomic predictors.

Health outcomes were categorized in several groups: obesity, smoking, hypertension, diabetes, cardiovascular health, cancer (morbidity), mental health, mortality (any cause), or other. The group other consisted of outcomes which were present in too few numbers, such as; anemia, substance abuse, kidney disease, compliance of pharmacological treatment, self-reported health status, dental health etc.

Socioeconomic determinants which were included were: education, employment, family affluence, income, material status, occupation, social class, and wealth index.

Absolute numbers and percentages were used to summarize the data.

4. RESULTS

A total of 66 studies were included in this systematic review, out of 12,781 items identified through literature search. In these studies, there were a total of 161 combinations of examined health outcomes and socioeconomic determinants, meaning that some studies have examined several outcome- socioeconomic determinants associations.

Figure 2 shows the percentage of papers published from each of the included countries. It can be seen that the highest percentage are from Croatia and Serbia, and the lowest from Montenegro.

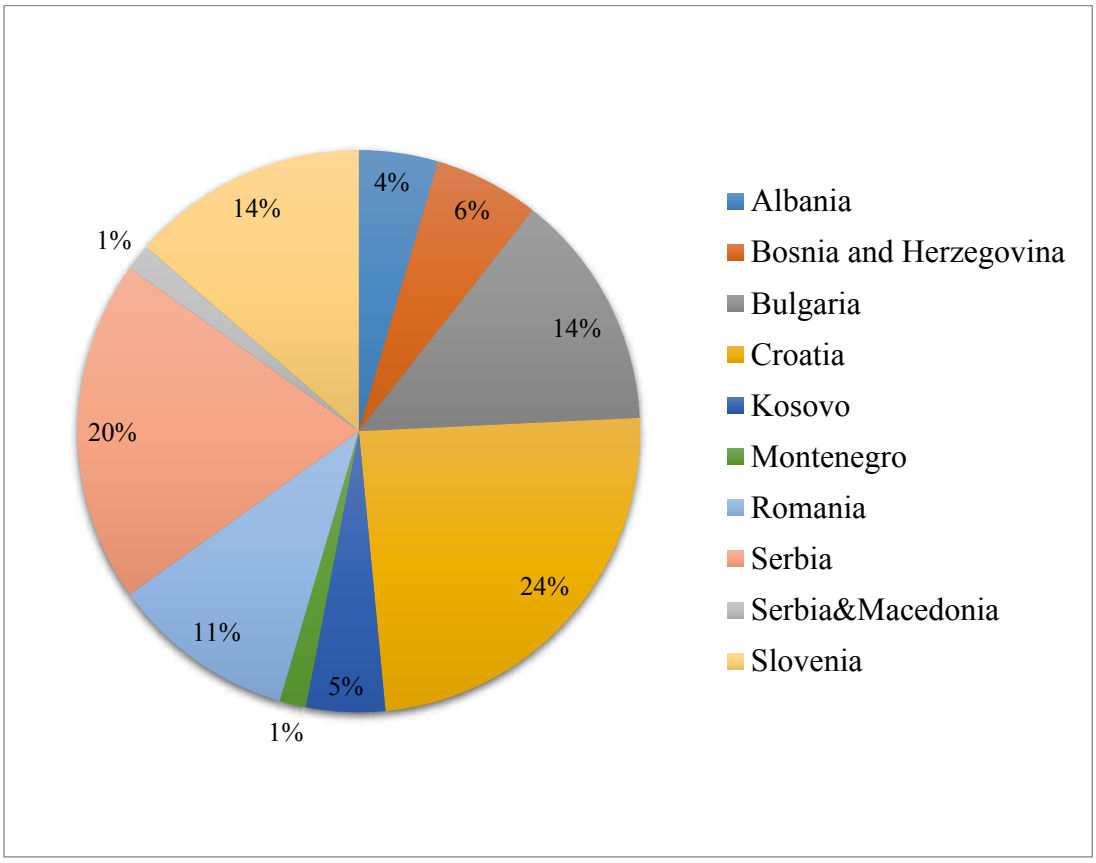
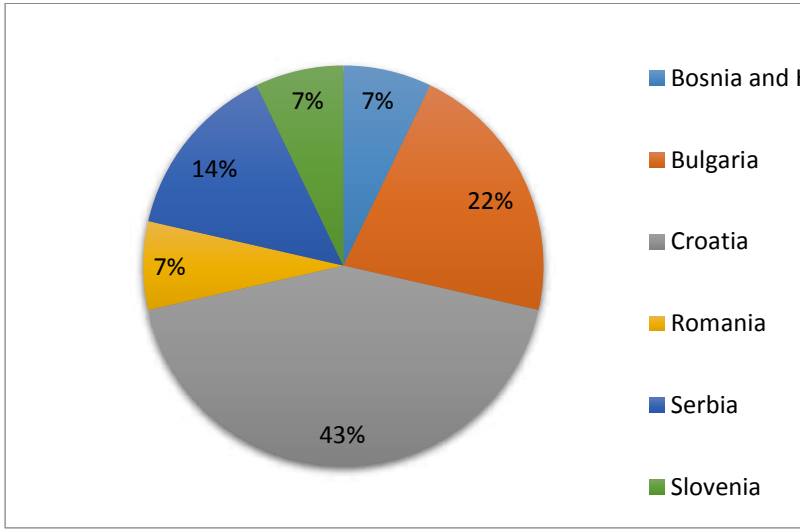


Figure 2. The percentage of papers published from each of the included countries in the observed period (1995-2007)

Figure 3 shows the percentage of published papers per country and according to the observed period. During the first period, there were a total of 14 published papers and 42.8% of them were published by Croatian scientists, followed by scientists from Bulgaria (21.4%) and Serbia (14.3%), while other countries had less than 10% of published papers on socioeconomic status and health outcomes. In the second period, between 2010-2017, a total of 52 papers were published. The countries with most published papers in this period were Serbia (21.1%), Croatia (19.3%), Slovenia (15.4%), Bulgaria (11.5%) and Romania (11.5%) (Figure 3).

Table 1. shows the distribution of total number and percentage of investigated health outcomes, according to the country of published studies. The total number of health outcomes is 161, which is more than published studies. This is due to the fact that some studies have published the results for more than one health outcome. Scientists from Croatia and Serbia have examined several health outcomes which logically has increased the total amount of articles published, whereas Montenegro examined only hypertension in relation to socioeconomic status. In general, in the Balkans, obesity seems to be the morbidity mostly investigated in relation to socioeconomic status. However, this differs between countries. For example, in Bosnia and Hercegovina, the majority of published studies investigated cardiovascular disease whereas none investigated obesity and its association to socioeconomic status.

Period 1995-2009 (N=14)



Period 2010-2017 (N=52)

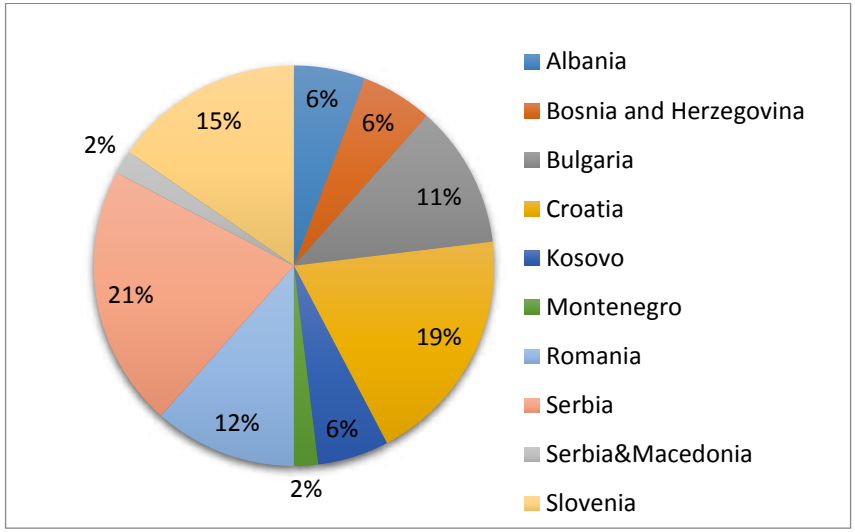


Figure 3. The percentage of papers published from each of the included countries, separately for two times periods.

Table 1. Distribution of total number and percentage of investigated health outcomes (N=161), according to the country of published studies

	Albania (N=9)	Bosnia and Herzegovina (N=7)	Bulgaria (N=17)	Croatia (N=25)	Kosovo (N=7)	Macedonia (N=3)	Montenegro (N=2)	Romania (N=18)	Serbia (N=50)	Serbia& Macedonia (N=1)	Slovenia (N=22)
Obesity; N (%)	0 (0)	0 0 (0)	7 (41.2)	5 (20.0)	0 (0)	1 (33.3)	0 (0)	3 (16.7)	4 (8.0)	0 (0)	1 (4.5)
Smoking; N (%)	0 (0)	0 (0)	0 (0)	1 (4.0)	0 (0)	0 (0)	0 (0)	5 (27.8)	2 (4.0)	1 (100)	2 (9.1)
Hypertension N (%)	5 (55.6)	0 (0)	0 (0)	0 (0)	1 (14.3)	0 (0)	1 (50.0)	0 (0)	4 (8.0)	0 (0)	0 (0)
Diabetes; N (%)	0 (0)	0 (0)	0 (0)	3 (12.0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (8.0)	0 (0)	0 (0)
Cardiovascular health; N (%)	0 (0)	4 (57.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (4.0)	0 (0)	0 (0)
Cancer; N (%)	0 (0)	0 (0)	0 (0)	1 (4.0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (10.0)	0 (0)	4 (18.2)
Mental health; N (%)	0 (0)	0 (0)	0 (0)	2 (8.0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (8.0)	0 (0)	3 (13.6)
Mortality; N (%)	0 (0)	0 (0)	1 (5.9)	0 (0)	0 (0)	0 (0)	0 (0)	2 (11.)	0 (0)	0 (0)	4 (18.2)
Other outcomes; N (%)	4 (44.4)	3 (42.9)	9 (52.9)	13 (52.0)	6 (85.7)	2 (66.7)	1 (50.0)	8 (44.4)	25 (50.0)	0 (0)	8 (36.4)

Figure 4 shows the frequency of investigated health outcomes to be associated with socioeconomic status, in papers published in the Balkans region during the 1995-2017 period. Obesity was the most commonly investigated outcome (13%), followed by smoking (7%), hypertension (7%), mental health (6%), cancer (6%) and diabetes (4%).

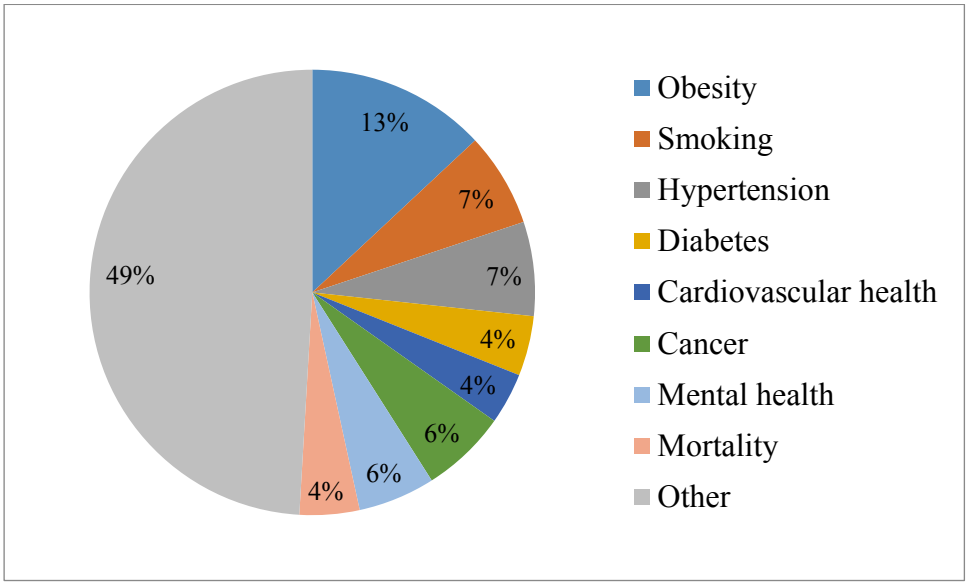


Figure 4. Health outcomes investigated in papers published in the Balkans region during the 1995-2017 period (N=161)

Figure 5 shows the frequency of investigated socioeconomic status determinants, in papers published in the Balkans region during the 1995-2017 period. Education was the most commonly investigated socioeconomic determinant (40%), followed by wealth index (17%), employment (16%), and income (10%), while others were less frequently reported.

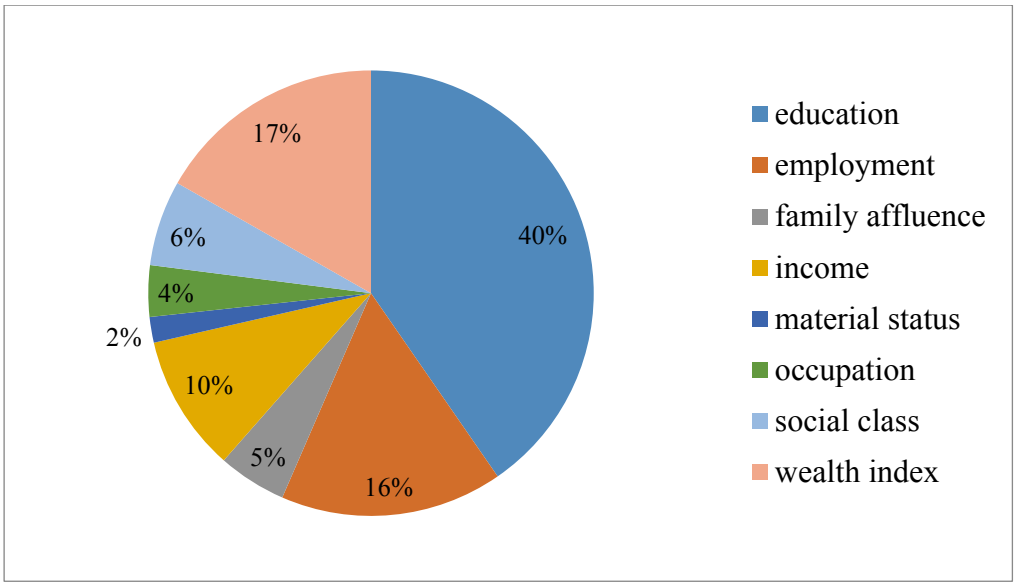


Figure 5. Investigated socioeconomic determinants in papers published in the Balkans region during the 1995-2017 period (N=161)

Table 2 shows investigated socioeconomic determinants, along with the health outcomes, in papers published in the Balkan region during the 1995-2017 period. The most commonly investigated socio-economic predictors in the Balkan region were education, wealth index and employment, whereas the occupation has been looked upon in only 4% of the papers published. In the published papers, the education has been investigated for the association with all of the morbidities, i.e. obesity (38%), smoking (64%), hypertension (36%), mortality (43%), mental health (22%), diabetes (29%), cardiovascular health (33%), and cancer (50%). Employment was most commonly investigated in mortality (43%), family affluence with obesity (14%), income with obesity (24%) and diabetes (29%), wealth index with cardiovascular health (50%) (Table 2).

Table 2. Investigated socioeconomic determinants, combined with health outcomes, in papers published in the Balkan region during the 1995-2017 period (N=161)

	Obesity N=21	Smoking N=11	Hypertension N=11	Mortality N=7	Mental health N=9	Diabetes N=7	Cardiovascular health N=6	Cancer N=10	Other N=79
Education; N	8	7	4	3	2	2	2	5	32
%	38.1%	63.6%	36.4%	42.9%	22.2%	28.6%	33.3%	50.0%	40.5%
Employment; N	2	1	1	3	3	1	1	1	13
%	9.5%	9.1%	9.1%	42.9%	33.3%	14.3%	16.7%	10.0%	16.5%
Family affluence; N	3	0	0	0	1	0	0	0	4
%	14.3%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%	5.1%
Income; N	5	1	0	0	0	2	0	2	6
%	23.8%	9.1%	0.0%	0.0%	0.0%	28.6%	0.0%	20.0%	7.6%
Material status; N	0	0	0	0	0	0	0	0	3
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%
Occupation; N	1	0	1	1	0	1	0	1	1
%	4.8%	0.0%	9.1%	14.3%	0.0%	14.3%	0.0%	10.0%	1.3%
Social class; N	2	1	2	0	1	0	0	0	4
%	9.5%	9.1%	18.2%	0.0%	11.1%	0.0%	0.0%	0.0%	5.1%
Wealth index; N	0	1	3	0	2	1	3	1	16
%	0.0%	9.1%	27.3%	0.0%	22.2%	14.3%	50.0%	10.0%	20.3%

5. DISCUSSION

Researchers have shown important and statistically significant association between low socio-economic status and high morbidity and mortality. Valuable predictors of socio-economic status have been developed, i.e. education, occupation and income, and these predictors are today recognized to have great impact on health outcome.

Socio-economic status and its impact on health varies among countries. By looking at one variable, ex cardiovascular disease, one can have a range of variation of inequalities among populations and regions in Europe, ranging from *reverse inequalities* (high rates of death among higher educational level) and *regular inequalities* (high rates of death among lower educational level) (1).

The noted range of variation of socio-economic status and its impact on morbidity and/or mortality explains the between-country differences of socio-economic inequalities and its impact on health. Certain health outcomes (e.g. cardiovascular disease) having such an impact on mortality rates are more common in countries in Eastern Europe, such as Hungary, and therefore also display higher mortality rates compared to countries in Nordic and Southern Europe, such as Sweden, Spain and Italy. Furthermore, differences between countries in levels of inequality in mortality may be partially explained by the countries' different levels of egalitarian social and economic policies. Socio-economic gaps between social class within countries as well as between countries are another possible explanation to why socioeconomic status has less effect on mortality rates in Sweden compared to Hungary, Poland and Czech Republic, the latter in which socio-economic gaps between social class are significantly larger, and subsequently leading to larger inequality in mortality between socio-economic groups within those countries compared to Sweden.

Several studies have shown that socio-economic status and inequities of health are directly related to inequalities in health outcome. This is however not as simple as it seems, since the measurements themselves require a separate analysis and afterthought regarding their relevance, due to several noticeable anomalies in results of the impact of socio-economic status on health outcome and inequalities.

The methods used in measuring the outcomes are not ideal and have limitations. The level of reliability of results depend on how data was collected, the variables used, and which methods were used for measurement.

The degree of comparability declines with increasing geographic coverage and the collection of data varies among countries affecting the results of such measurements.

Measuring socio-economic status and its impact on health has been a challenge for researchers in order to gather data comparable among countries and over time. By defining socio-economic status into different categories; education, occupation and income; the subject becomes clearer. However, these predictors have several weaknesses in regard to their measurement of socio-economic status.

Education, as one of the measures of socio-economic status, is a reliable predictor since it is acquired in early adulthood, developed throughout life and is not influenced by chronic disease in the same way as occupation or income. Knowledge and expertise are known to be essential for countries to be able to achieve high levels of economic growth, being another important integral part of health care improvement.

As one of the predictors, education has a substantial impact on several health outcomes. Smoking, obesity, infectious diseases, mental health, diabetes and multi-morbidity are all associated with education-related inequalities in mortality rates (4-6,18,22,23,28).

Cardiovascular disease, as one of the leading causes of death in Europe, is the major cause of education-related inequalities in mortality in Europe (1). This is however not as simple, since education is not the sole predictor of mortality rates due to cardiovascular disease but also income, occupation, environment which are non-modifiable factors. However, if we accept the non-modifiable risk factors (age, gender, genetics, race and ethnicity), substantial reduction of cardiovascular incidents and mortality rates can be achieved by educating the population about the modifiable risk factors for cardiovascular disease. These include physical activity, healthy diet, smoking reduction, and appropriate medical control of high risk conditions such as diabetes, hypertension, hyperlipidemia.

Income, as stated in the section introduction, is generally measured in absolute numbers (1). It is assumed that the income of a household is equally shared among members of that household. However, it is apparent that this cannot represent the true distribution among members. Children, single-working parent household, grandparents do not generate money, still the income of the household is distributed equally among all of them when measuring income and its relation to inequalities of health. The “black economy”, which is present all over the world, can not be measured, since it is paid work that is not reported. Furthermore, when comparing among countries the income is represented by national figures.

Failure to fill in forms or inaccurately filled forms creates inaccurate national curve figures, consequently creating errors in calculations. Economical indicators such as GNP, nominal GDP per capita or GDP per capita PPP are not ideal and creates unavoidable errors in estimating the market value of a country. Rise in national income can not be directly applied or translated into higher living standards, it may not even affect living standards at all; the state may not distribute the wealth to its population at all, or may invest the wealth for example into military warfare, instead of general welfare.

Many factors affect quality of life but such factors are automatically excluded from measuring income. Accounts measure only paid activities and excludes "do-it-yourself" activities and work of parents at home.

Another interesting aspect regarding income-related inequalities in health is that the impact of income on health is not solely absolute but also relative, meaning that after a certain point, the relationship between mental and emotional well-being and the environment, i.e. social and psychosocial circumstances, have a stronger influence on health outcome and life-expectancy than the absolute income distribution. This is where application of concepts such as Human development index, standard of living, quality of life and health related quality of life comes in.

Although repeated data show a clear positive association between low socio-economic status and higher morbidity and mortality, sometimes there are inconsistencies, opposing the general tendency showing a negative association.

Interestingly, in one study looking at a local comparison between different populations in Croatia, the findings show no or little association between low socio-economic status, and increased morbidity and mortality (29). This however, is not as ground-breaking as it might sound, as the populations in the study were more or less homogenous (island populations), as well as the geographic area that was limited in size. The authors themselves seem to conclude that the findings are an exception, to the well known fact that low socio-economic status is strongly associated with increased morbidity and mortality, and that exception is rather connected to the method of the study and its limitations. This reminds us of the importance of census-linked methods of gathering information regarding socio-economic status, were the focus should be on reproducibility in any population and in any geographic area. Only this way will the data later be useful for comparison in national and international studies.

Looking at for example colorectal cancer the mortality rates are, as expected, higher among lower socio-economic groups. However interestingly, the incidence of colorectal cancer is higher among higher social class and developed countries (19). Similar results are seen in pancreatic cancer (26). This finding is most likely attributed to the known risk factors; diet and life-style of that social group, and their superior survival attributed to screening programs and thereby earlier medical intervention in high-income countries.

Increased use of tobacco among high socio-economic groups in Balkan and higher educated population in Portugal and Greece is another interesting negative association (24,25). The reason for this contradictive finding is yet unknown.
Perhaps having in common the geographical belt, i.e. Mediterranean region, as well as the cultural similarities between these countries make them share characteristics. The smoking-epidemic has in general decreased in western Europe compared to eastern and southern regions. Efforts to limit the space where you can smoke have had an impact. Tobacco has been prohibited by law in many public spaces, and several countries have declared themselves as “smoke-free”, meaning no smoking in restaurant, bars, and public buildings and in some countries even public places. Taxation has become another effective method of tobacco control.

The fact that lung cancer, as such an easily preventable disease still remains the largest killer among cancers globally, reminds us how important it is to address tobacco use not just in the setting of health care, but also with creative political solutions.

Observations above remind us of the between-country differences and that the relationship between socio-economic status and its impact on health is not clear-cut and linear but rather complex and multifactorial, challenging the conventional views of inequalities in health between countries.

6. CONCLUSION

A total of 66 studies on association between socioeconomic status and health outcomes have been identified in the literature, published by scientists from Balkans They were examining the relationship and association between the well known fact that low socio-economic status is strongly related to increase in morbidity, multi-morbidity, and mortality. Negative effect of socioeconomic status, namely education, wealth index and employment was investigated as predictors of poor health outcomes, most commonly obesity, smoking, hypertension, mental health, cancer and diabetes.

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8. SUMMARY

Objectives: The aim of this study was to systematically evaluate scientific literature on socio-economic inequalities and investigate the focus of such scientific research regarding the health outcomes in the Balkan countries.

Materials and methods: A detailed systematic search was performed to summarize published data related to the socioeconomic inequalities in various health-related variables in Balkan geographic area, using different databases. Period between 1995 and 2017 was included.

Results: A total of 66 studies were included in this systematic review, with a total of 161 combinations of examined health outcomes and socioeconomic determinants. The results from the two divided time-periods, 1990-2009 vs. 2010-2017, show that the majority of total published papers (out of 14 papers) from the first period were by Croatian scientists (42.8%), followed by Bulgarian (21.4%), and Serbian (14.3%) scientists. In the second period, more papers were published, a total of 52 papers. The countries with most published papers in this later period were Serbia (21.1%), Croatia (19.3%), Slovenia (15.4%), Bulgaria (11.5%) and Romania (11.5%). Among the papers published in the Balkans region during the 1995-2017 period, the results show that in 40% of the studies education was used as the socioeconomic determinant, followed by wealth index (17%) and employment (16%). The most commonly investigated health outcomes were obesity (13%), followed by smoking (7%), hypertension (7%), mental health (6%), cancer (6%) and diabetes (7%).

Conclusion: Socioeconomic status has recently gained more attention from scientists from the Balkan countries, compared to the previous period. Health outcomes which were investigated in relation to the socioeconomic status are those with greatest burden of diseases.

9. CROATIAN SUMMARY

Cilj istraživanja: Svrha ove studije bila je sustavno procijeniti znanstvenu literaturu o socioekonomskim nejednakostima i istražiti fokus takvih znanstvenih istraživanja o zdravlju u balkanskim zemljama.

Materijali i metode: Detaljno sustavno pretraživanje literature provedeno je sažimanjem objavljenih podataka vezanim uz socioekonomske nejednakosti kao odrednica različitih zdravstvenih ishoda na balkanskom geografskom području, koristeći različite znanstvene baze podataka. Promatrano razdoblje bilo je od 1995. godine do 2017. godine.

Rezultati: U ovom sustavnom pregledu uključeno je ukupno 66 studija, s ukupno 161 kombinacijom ispitanih zdravstvenih ishoda i socioekonomskih determinanti. Rezultati dvaju vremenskih razdoblja, ranijeg 1990.-2009. nasuprot kasnijem 2010-2017. godine, pokazuju kako su znanstvenici iz Hrvatske objavili najveći broj radova (42,8%), a slijedili su ih bugarski (21,4%) i srpski (14,3%) znanstvenici. U drugom razdoblju objavljeno znatno više radova, njih ukupno 52. Zemlje s najviše objavljenih radova u ovom kasnijem razdoblju bile su Srbija (21,1%), Hrvatska (19,3%), Slovenija (15,4%), Bugarska (11,5%) i Rumunjska (11,5%). Među radovima objavljenim na području Balkana tijekom razdoblja od 1995. do 2017. godine, rezultati pokazuju da je u 40% studija korišteno obrazovanje kao socioekonomska determinanta, a slijedi indeks bogatstva (17%) i zaposlenje (16 %). Najčešće istraženi zdravstveni ishodi bili su pretilost (13%), zatim pušenje (7%), hipertenzija (7%), mentalno zdravlje (6%), tumori (6%) i dijabetes (7%).

Zaključak: Znanstvenici iz balkanskih zemalja u novije vrijeme više pozornosti posvećuju socioekonomskom statusu, u usporedbi s ranijim razdobljem. Zdravstveni ishodi koji su istraživani u odnosu na socioekonomski status su oni koji imaju najveće opterećenje bolesti.

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