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The effect of urban-area unemployment on the mental health of citizens differs between Slovak and Dutch cities

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ABSTRACT

Conclusive evidence on the association of mental health problems (MHP) with area unemployment is lacking in regard to Central European cities. We obtained data on residents aged 19–64 from Slovak and Dutch cities from the FP7 EURO-URHIS 2 project. Multilevel logistic regression showed that the association between MHP (GHQ-12-total score ≥ 2) and area unemployment was strong in the Netherlands, but absent in Slovakia. Slovak citizens from the most favourable neighbourhoods had nearly double the risk of MHP than their Dutch counterparts. Individual-level socioeconomic characteristics did not explain area differences. The effect of urban-area unemployment seems to differ between Central European and Western European countries.

1. Introduction

The urban context is known for a frequently higher prevalence of mental health disorders (Pinto-Meza et al., 2013; Galea et al., 2005; de Vries et al., 2003). This especially concerns deprived neighbourhoods (Mair et al., 2008; Matheson et al., 2006). This phenomenon is explained in two ways. First, there is a higher occurrence of stressors in deprived urban areas, such as crowding and noise (Guite et al., 2006), a densely built environment (Galea et al., 2005), more crime and violence in the area, a lack of green spaces (Sugiyama et al., 2008) and a lack of economic resources (Pattyn et al., 2011), which may function as triggers of mental health problems (MHP). Second, a selective migration of residents may occur to and within cities; i.e. people with poor (mental) health tend to move to poor urban neighbourhoods (Piro et al., 2007) or those with poor mental health are less able to move out of poor urban neighbourhoods than their neighbours with good mental health.

Studies that examined the effect of neighbourhood socioeconomic position on mental health disorders are not consistent in their findings (Mair et al., 2008). Some studies concluded that living in socially and economically deprived neighbourhoods contributed to an increased risk of mental health disorders independent of individual characteristics (Galea et al., 2007; Matheson et al., 2006; Ross, 2000). Others reported that a higher prevalence of mental health disorders in socioeconomically disadvantaged neighbourhoods is the result of a concentration of residents with low socioeconomic status in deprived neighbourhoods (Pikhartova et al., 2009; Reijneveld and Schene, 1998; Propper et al., 2005).

To our knowledge only three studies have estimated the prevalence of mental health problems in urban areas in the healthy adult population in Central European (CE) countries (Pikhartova et al., 2009; Nicholson et al., 2008; Bobak et al., 2006). From those, only one (Pikhartova et al., 2009) examined the association between depressive symptoms and socioeconomic area deprivation (in the Czech Republic). The other two (Nicholson et al., 2008; Bobak et al., 2006) provide evidence that the so-called East–West health gap is also present for mental health. They found a higher prevalence of depressive symptoms in the urban population in Poland and Russia compared with the Czech Republic.

However, a direct comparison of a Central and a Western European (WE) country regarding mental health problems in

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deprived urban areas has not yet been performed. Thus, we wanted to compare Slovakia and the Netherlands, two countries which are both participating in the EURO-URHIS2 project. These countries are in different stages of economic development, offering the possibility of observing potential differences or similarities in factors associated with the mental health of urban residents.

The Slovak Republic is a former communist country which was established in 1993 after the peaceful split of Czechoslovakia into Slovakia and the Czech Republic. The formerly centrally planned economy has been transformed into a market economy and in 2004 Slovakia joined the European Union (EU) with other 9 "new" Member States. Slovakia is among the world's top 70 in terms of total gross domestic product (GDP) (World Bank, 2011). The annual average unemployment rate in 2012 represented 14% (Eurostat, 2013a). The Netherlands is among the world's top 20 in terms of total GDP (World Bank, 2011) and is one of the founding members of the EU. As opposed to Slovakia, it belongs among the EU countries with the lowest unemployment rates. In 2012 the annual average unemployment rate was 5.3% (Eurostat, 2013a). Both countries belong to the countries with the lowest at-risk-of-poverty rates, having 13% and 11% of citizens, respectively, who live with an income below 60% of the national median income after social transfers (European Commission, 2013a, 2013b).

The main aims of this study were (1) to examine whether the prevalence of MHP was higher in deprived neighbourhoods regarding area unemployment; (2) whether the association of MHP with area unemployment differed by country; and (3) whether this could be explained by the socioeconomic characteristics of citizens. We restricted our analysis to people aged 19–64 years.

2. Methods

2.1. Sample and procedure

Data was collected within the European Urban Health Indicators project (EURO-URHIS 2) in the two largest cities in Slovakia – Bratislava (capital; 432,801 inhabitants in 2010) and Kosice (233,886 inhabitants in 2010) – and in two comparable Dutch cities, Amsterdam (capital; 779,808 inhabitants in 2010) and Utrecht (311,367 inhabitants in 2010). In each city a representative sample of 800 persons aged 19–64 years was approached, stratified by gender. All respondents received identical self-administered postal questionnaires in their own language along with a stamped return envelope. Questionnaires were accompanied by a cover letter informing about the project and a confidentiality statement on each returned questionnaire.

Regarding the Slovak cities, the sample was randomly selected by the Population Registry Office of the Slovak Republic. In order to motivate respondents, a raffle (9 gift vouchers of €10) and gift incentives (a bookmark with calendars) were used. Non-respondents were contacted repeatedly by two postal reminders and by telephone. Data collection lasted from September 2010 to March 2011.

Regarding the Dutch cities the sample was randomly selected from the municipal population register in each city. As an incentive to participants, a raffle (4 gift vouchers of €50) was used in Amsterdam and a lottery (2 vouchers of €100) was used in Utrecht. Non-respondents in Amsterdam were contacted in two additional mailings and in Utrecht also approached by phone calls. Data collection lasted from September 2010 to January 2011.

Invalid addresses ($n=156$), deaths ($n=5$) and an inability to complete the questionnaire due to living/working abroad ($n=20$) were deducted from the original Slovak sample size. Thus, the overall response rate in Slovakia was 44.5% ($n=631$); refusals concerned 18.4% ($n=261$) and other non-response 37.1% ($n=527$). Other non-response concerned respondents who did not give any response and had invalid/unreachable phone numbers. Respondents did not differ from non-respondents regarding gender (Cohen's $W=0.09$).

The overall response rate in the Netherlands was 42.6% ($n=673$), after invalid addresses ($n=22$) were subtracted. No deaths or incapacities to complete the questionnaire occurred. Refusals represented 8.7% ($n=137$) and non-respondents 48.7% ($n=768$). Respondents did not differ from non-respondents regarding gender (Cohen's $W=0.13$).

2.2. Measures

The original questionnaire of EURO-URHIS 2 was translated from English into Slovak and Dutch and back translated afterwards. Differences between the original and back translations were discussed by the research team to optimise the translation.

2.2.1. Individual-level data

Mental health problems were measured by the General Health Questionnaire (GHQ-12) (Goldberg, 1992). The GHQ-12 was developed as a screening tool to detect individuals that have, or are at risk of developing, psychiatric disorders. It measures common mental health problems/domains of depression, anxiety, somatic symptoms and social withdrawal. The questions of the GHQ regard the past 2 weeks (e.g., constantly under strain, feeling unhappy and depressed). Next, respondents have to rate how usual this is for them on a four-point scale. We scored responses bi-modally (0-0-1-1), with reversing of responses where needed, so that the higher the score, the more problems a respondent has met. Having mental health problems was then defined as a GHQ-total score ≥ 2, following the manual. Missing data were imputed if numbering maximally two, using the average score. The Cronbach's alpha in our sample was 0.88.

Socioeconomic status of respondents was measured by educational level, household income and economic activity. Education (The European health interview survey, 2006) was assessed by a question on the highest educational level attained. Responses were divided into three categories. No formal education and primary education were categorised as low educational level. The other two groups represent respondents with secondary and university education, respectively.

Composition of the household concerned the number of adults aged 18 and over and children aged 0–17 who lived in the household. Household income was measured by self-reported annual household income (The European health interview survey, 2006). The income per capita was adjusted for household size by the OECD modified scale by dividing by the number of adults and children in the household (OECD, 2011). This was then divided into tertiles of adjusted household income (low, medium, high) and was separately categorised for Slovakia and for the Netherlands.

Economic activity of respondents was measured by a question about their occupational category, which comprised (1) employed, (2) unemployed, (3) housewives, (4) students, (5) long-term work disabled and (6) pensioners. The housewives category may include also men who stay at home. Respondents answering with option 1 were tracked as economically active and with options 2 to 6 as economically inactive.

2.2.2. Neighbourhood-level data

Neighbourhood unemployment rate was chosen as the measure of area deprivation, as it might be a source of urban stressors and have an impact on the mental health of residents in a neighbourhood. Slovak neighbourhoods concerned local administrative units on the lower level (the LAU 2 level) as defined by Eurostat (Eurostat, 2010). Dutch neighbourhoods concerned areas

Table 1
Background characteristics of the samples per country, age-range 19–64 years[a].

	Total sample ($N=1275$)				
	Slovakia ($N=616$)		**Netherlands** ($N=659$)		P[b]
Age					
Mean age (± standard deviation)	46.2 (± 11.8)		40.1 (± 12.2)		n.s.
	N	%	*N*	%	
Sex					n.s.
Men	258	41.9	281	42.6	
Mental health problems					n.s.
Yes	242	39.3	258	39.2	
Adjusted household income (€) Mean (± SD)	11912.0		38072.8		< 0.001
Mean (± SD)	(9965.2)		(49755.2)		
Adjusted household income[c]					
Low	178	33.2	172	33.4	
Medium	182	34.0	171	33.2	
High	176	32.8	172	33.4	
Educational level					< 0.001
Low	30	4.9	43	6.6	
Secondary	294	47.8	229	35.1	
University	291	47.3	380	58.3	
Economic activity					< 0.001
Economically inactive	215	35.1	159	24.4	

[a] Percentages do not always add up to 100% due to rounding.
[b] Chi-square test for categorical and t- test for continuous variables.
[c] Categories of adjusted household income (in Euros): for Slovakia low < 5820.00, medium 5820.01–9333.33, high > 9333.34; for the Netherlands low < 17 692.31, medium 17 692.32–33 333.33, high > 33 333.34.

based on postcode sectors. We used Census data for Slovak neighbourhoods (Statistical Office of the Slovak Republic, 2002) and registered unemployment municipality data for Dutch neighbourhoods (UWV WERKbedrijf, 2010) for the total proportion of unemployed residents (Unemployed ≥ 16 years looking for their first job or having worked before). Data were split into tertiles of area unemployment (least favourable, medium and most favourable) and were separately categorised for Slovakia and for the Netherlands.

Analyses were done on the sample of respondents with non-missing values on MHP and area unemployment.

2.3. Statistical analyses

First, we assessed the differences in MHP in each country by tertiles of area unemployment using chi-square tests. Second, we employed multilevel analyses to assess differences in MHP by area deprivation. We computed the odds ratios for the tertiles of deprived neighbourhoods, crude and adjusted for age, sex and their interactions. We then added the country to the model and the interaction of the country with area unemployment. Third, we added the measures of individual SES to the model (education, household income, economic activity), separately and jointly, and assessed whether these explained area differences in MHP. We repeated the analyses with unemployment as a continuous variable for both countries combined. Moreover, we repeated both analyses per country.

We computed median odds ratios (MOR) as interpretable measures of neighbourhood-level variance. The MOR is the median value of the odds ratios between the area with the highest risk and the area with the lowest risk when randomly picking out two areas. It shows the extent to which the individual probability of MHP is determined by residential area. It thus quantifies contextual effects on an odds ratio scale. For example, if the MOR is 1.50, this shows that the median odds of having mental health problems for the individual living in the more deprived area are 1.5 times greater than the individual in the less deprived area when randomly selecting two persons in different areas (Merlo et al., 2006).

The occurrence of MHP was modelled as a binary outcome variable in logistic regression models of citizens (level 1) nested within neighbourhoods (level 2). Multilevel regression analyses were performed in MlwiN 2.02 (Rasbash et al., 2005). All other analyses were done using IBM SPSS 20.

3. Results

3.1. Characteristics of the sample

The Slovak sample comprised 616 respondents from 31 neighbourhoods. The mean age of the residents was 46.2 years (SD = 11.8); 41.9% were men. The Dutch sample comprised 659 respondents living in 98 neighbourhoods. The mean age of the residents was 40.1 years (SD = 12.2); 42.6% were men. Respondents' background characteristics and area characteristics per country are described in Tables 1 and 2.

The overall rates of MHP did not differ between Slovakia (39.3%) and the Netherlands (39.2%). However, there were between-country differences in the prevalence of MHP regarding tertiles of area unemployment. In Slovakia, we did not observe a gradient relationship. Forty percent of the respondents in the most favourable neighbourhoods had an increased GHQ-12 score, indicating mental health problems, compared with 35.4% in the least favourable neighbourhoods. On the other hand, we did find a gradient for the Netherlands. MHP occurred more frequently among respondents from the least favourable neighbourhoods (46.9%) compared to the most favourable neighbourhoods (29.6%) (Table 3). Differences between the level of area unemployment and the occurrence of MHP were significant in the Netherlands but not in Slovakia.

Multilevel logistic regression showed that the relationship between MHP and area unemployment remained statistically significant after adjustment for age/sex and their interactions (Table 4) (Model 1). The trends, however, differed by country, as shown by the statistically significant interaction of area

Table 2
Area characteristics per country, age group 19–64.

Area characteristics		
	Number of neighbourhoods	
Number of respondents per neighbourhood	Slovakia ($n=31$)	The Netherlands ($n=98$)
≤ 5	14	47
6–10	2	33
11–30	7	18
>31	8	0
Tertiles of neighbourhood unemployment	**Neighbourhood unemployment (Mean, (SD))**	
	Slovakia	The Netherlands
Least favourable	19.80 (1.95)	8.85 (1.52)
Medium favourable	16.64 (0.81)	5.12 (0.95)
Most favourable	8.48 (1.45)	2.79 (0.51)

Table 3
Prevalence of an elevated score on the General Health Questionnnaire-12 by tertiles of neighbourhood unemployment rate in urban neighbourhoods in Slovakia (Bratislava, Kosice) and in the Netherlands (Amsterdam, Utrecht) among 19–64 years old.

	Elevated score on GHQ-12 (cases/population; (percentage))	
	Slovakia ($n=616$)	The Netherlands ($n=659$)
Area deprivation (unemployment)		
Most favourable	100/250 (40.0%)[n.s.]	66/223 (29.6%) *
Medium favourable	74/174 (42.5%)	93/225 (41.3%)
Least favourable	68/192 (35.4%)	99/211 (46.9%)
Overall	242/616 (39.3%)	258/659 (39.2%)

Significance levels χ^2 statistics.
* $p<0.001$, n.s.$=p>0.05$.

unemployment by country (Model 2). In the Netherlands the occurrence of MHP followed a gradient distribution. Dutch residents from the medium (OR 1.68, 95% CI 1.13–2.51) and the least favourable (OR 2.12, 95% CI 1.42–3.17) neighbourhoods had a higher risk of MHP than residents from the most favourable neighbourhoods. On the other hand, a flat distribution was observed in Slovakia. While residents from the medium favourable areas in Slovakia had 14% increased odds of MHP (OR 1.14; multiplication of the interaction effect by the main effect $0.68\times 1.68=1.14$) compared with residents from the most favourable neighbourhoods, residents from the least favourable areas had a slightly lower odds (OR 0.83; $0.39\times 2.12=0.83$) of MHP compared with residents from the most favourable neighbourhoods.

Overall, the risk of MHP significantly differed between Slovakia and the Netherlands for the most favourable tertiles. As can be seen in Model 2, Slovak citizens from the most favourable neighbourhoods had almost double the risk of MHP compared with Dutch citizens (OR 1.66, 95% CI 1.11–2.47) from the same type of areas.

Adjusted for individual SES, the association between MHP and medium and least favourable socioeconomic position of areas was strongest for the Netherlands after adjustment for income (Model 3). This adjustment increased for individual income the OR of MHP for the residents of the least favourable Dutch neighbourhoods by 17.9% (Model 2 vs. Model 3). The biggest difference in the gradient between Slovakia and the Netherlands was found after adjustment for education (Model 4). The difference in SE gradient between Slovakia and the Netherlands became even bigger after adjustment for all indicators of individual SES jointly (Model 6).

Area clustering of MHP was observed in almost all models, apart from those with an adjustment for income status (Model 3) and for all individual SE indicators (Model 6).

Repeating the analyses with unemployment as a continuous variable showed that in a fully adjusted model in the Netherlands, the risk of MHP increased with neighbourhood unemployment (OR 1.11, 95% CI 1.03–1.19). This differed between the Netherlands and Slovakia, as the interaction of area unemployment by country was statistically significant (OR 0.88, 95% CI 0.81–0.95). Within this analysis the risk of MHP in Slovak neighbourhoods was not significantly higher than in the Netherlands (OR 0.86, 95% CI 0.54–1.37). Analyses per country yielded findings for both countries which resembled those for the combined approach, regarding unemployment both as a categorical and as a continuous variable (results not shown).

4. Discussion

We found that the association between the neighbourhood-unemployment rates (measured either as continuous or categorical variable) and MHP differed between the Netherlands and Slovakia. We observed a gradient relationship regarding the rate of MHP and area unemployment in the Netherlands, but not in Slovakia. Further, the two countries differed in rates of MHP for the most favourable tertiles of area unemployment, but did not differ in overall prevalence of MHP. Finally, individual-level socioeconomic characteristics did not explain the differences between the countries in the association of area unemployment with MHP.

Several previous studies reported that neighbourhood SES was associated with mental health and that mental disorders occur more frequently in low SES areas (Galea et al., 2007; Ross, 2000). This was observed in the Netherlands, too, where the risk of MHP gradually increased with the degree of area unemployment. For instance, residents from the least favourable neighbourhoods had nearly double the risk of developing MHP than residents from the most favourable areas. Similar outcomes were found in the past by Reijneveld and Schene (Reijneveld and Schene, 1998) in Amsterdam, where the prevalence of mental disorders was higher in areas with high unemployment rates.

In contrast, in Slovakia we did not find a relationship between area unemployment and the occurrence of MHP, i.e. residents from the least favourable neighbourhoods did not have a greater risk of MHP than others. This unexpected flat distribution may have roots in the communist past. First, in that time, urban development policy was linked to the main idea of the former regime: to establish social and economic equality. Housing was a political priority and was universally affordable due to extensive subsidies and macroeconomic price regulation (UNECE, 2011). Second, urbanisation was driven by intensive industrialisation. Rural migration to industrial centres generated an excessive demand for new housing, which was met by the mass production of large-scale, high-rise blocks of flats. Nowadays, given the availability of affordable loans and the demands for one's own housing, large housing blocks which are unique for neighbourhoods within Bratislava and Kosice are still inhabited by residents with different types of socioeconomic backgrounds. However, in a study from the Czech Republic, another Central European country, a gradient relationship (although weak) in depressive symptoms and the proportion of unemployed residents in urban areas was observed (Pikhartova et al., 2009).

Slovak citizens from the most favourable neighbourhoods had nearly twice the risk of MHP than Dutch citizens from the most favourable neighbourhoods. This shows that living in high SES neighbourhood does not necessarily mean the same for (mental) health in all countries. Initially, we expected that our result would be due to differences in the economies of the studied countries regarding income inequality. However, the Gini coefficient, the measure for inequality, in 2010 was similar for Slovakia (25.9) and

Table 4
Odds ratios with 95% confidence intervals of mental health problems in tertiles of neighbourhood unemployment rate, in urban neighbourhoods in Slovakia (Bratislava, Kosice) and in the Netherlands (Amsterdam, Utrecht); 19–64 age group.

	Model 1 ($n=1275$)	Model 2 ($n=1263$)	Model 3 ($n=1044$)	Model 4 ($n=1258$)	Model 5 ($n=1256$)	Model 6 ($n=1033$)
Area deprivation						
Most favourable	1	1	1	1	1	1
Medium	**1.38** (1.00–1.90)	**1.68** (1.13–2.51)	**1.83** (1.23–2.71)	**1.68** (1.14–2.49)	**1.76** (1.19–2.60)	**1.91** (1.29–2.83)
Least favourable	**1.39** (1.01–1.90)	**2.12** (1.42–3.17)	**2.32** (1.51–3.57)	**1.88** (1.25–2.82)	**2.10** (1.39–3.17)	**2.30** (1.49–3.56)
Country						
The Netherlands		1	1	1	1	1
Slovakia		**1.66** (1.11–2.47)	**2.41** (1.65–3.51)	**1.52** (1.08–2.14)	**1.64** (1.08–2.50)	**2.25** (1.57–3.22)
Interaction area deprivation *x* country						
Slovakia*most favourable		1	1	1	1	1
Slovakia*medium favourable		0.68 (0.38–1.21)	**0.48** (0.28–0.82)	0.72 (0.42–1.24)	0.65 (0.35–1.20)	**0.48** (0.28–0.83)
Slovakia*least favourable		**0.39** (0.22–0.69)	**0.24** (0.13–0.42)	**0.46** (0.27–0.78)	**0.37** (0.20–0.67)	**0.25** (0.14–0.45)
Measures of individual SES						
Low income status (vs. high)			**2.02** (1.33–3.06)			**1.67** (1.07–2.60)
Medium income status (vs. high)			1.20 (0.85–1.69)			1.14 (0.80–1.64)
Low education (vs. university)				**2.86** (1.65–4.96)		1.66 (0.87–3.17)
Secondary education (vs. university)				**1.70** (1.31–2.21)		**1.46** (1.07–2.01)
Economically inactive (vs. active)					**1.57** (1.19–2.08)	1.26 (0.87–1.83)
Random (median odds ratio)	1.28	1.11	1.00	1.03	1.17	1.00

Statistical significance at $p < 0.05$ is indicated in bold.
Model 1: adjusted for age, sex and their interactions.
Model 2: adjusted for age, sex and their interactions, country, interaction of country with area deprivation.
Model 3: idem Model 2+income status.
Model 4: idem Model 2+educational level.
Model 5: idem Model 2+economic activity.
Model 6: idem Model 2+ income status, educational level, economic activity.

for the Netherlands (25.5) (Eurostat, 2013b). In this case, regarding the Netherlands and Slovakia, a partial explanation might be due to the different economic situation in these countries; e.g., a survey on income and living conditions carried out by Eurostat shows that in 2011 the proportion of the population in severe material deprivation in densely populated areas was 8.5% in Slovakia and 3.2% in the Netherlands (Eurostat, 2012). Similarly, CE countries have been shown to have worse health outcomes than WE countries (Mackenbach et al., 2007; Zatonski et al., 2008). Further, it provides evidence on the importance of area-level studies in CE countries, even if the overall crude rates of MHP are very similar (39.3% in Slovakia and 39.2% in the Netherlands).

We also found that individual-level socioeconomic characteristics did not explain the between-country differences in the association of area unemployment with MHP. For the Netherlands, the relationship between MHP and area unemployment remained statistically significant after adjustment for demographic and SE characteristics of the residents concerned. Thus it seems that in the Netherlands the place of residence matters and that neighbourhood unemployment rates influence residents' health independently from their individual SE position. This contrasts previous findings (Reijneveld and Schene, 1998), in which most of the area differences were explained by the SE characteristics of residents. One explanation could lie in the methodological differences (personal interviews vs. postal questionnaires in our study, the inclusion of another Dutch city in our study). Another explanation may be real changes in time, since the studies are almost 20 years apart. A more recent study from Amsterdam (Agyemang et al., 2007) reports significant differences in self-rated health between neighbourhoods independent of individual-level demographic and SE factors. This may be interpreted as meaning that Dutch neighbourhoods have become more socioeconomically heterogeneous over time.

Furthermore, difference in the gradient between Slovakia and the Netherlands became biggest after inclusion of educational level of residents. This implies that in both Dutch cities a relatively large number of educated residents – like students – live in deprived areas. In particular, university students mostly choose their address independent of the SE position of a neighbourhood when they start living on their own (Reijneveld, 2002).

4.1. Study strengths and limitations

The strengths of our study are that we used standardised sampling, recruitment and data collection protocols developed within the EURO-URHIS2 project. Data collection was carried out in both countries at the same time of the year, making seasonal influences on mental health problems unlikely to cause inter-country differences. Next, we used a cross-culturally valid instrument to detect MHP (Goldberg et al., 1997). To our knowledge this was the first study comparing a Central and Western European country which used the GHQ-12 in the adult urban general population.

Furthermore, we respected the hierarchical nature of the data and applied multilevel analyses.

A limitation is the relatively low response rate, although the differences between respondents and non-respondents were trivial or small (Cohen's W in both countries was < 0.2) and the response rates were rather similar in both countries. We were only able to assess in this fixed age group gender differences between respondents and non-respondents. Particularly in regard to the issue of mental health disorders, it is possible that only the "healthier" respondents responded to the survey. Thus, the real rates of MHP in our results are likely to be underestimated. The use of only one indicator of neighbourhood SE position is another limitation. However, neighbourhood unemployment rate as an indicator of area deprivation has the advantage of being comprehensible for policy makers, thus offering a potential for effective interventions. In future research, the association between MHP and other indicators of area deprivation should be explored. A final limitation is that our sample did not comprise Roma in Slovakia or some non-Western ethnic groups in the Netherlands.

4.2. Implications

Different strategies should be applied in the Netherlands and in Slovakia, as we found the effects of place of residence on mental health to differ between these countries. In the Netherlands, the environment significantly contributes to the mental well-being of citizens, and therefore policies should target "risky" neighbourhoods with high unemployment rates by developing policies which increase employment. In Slovakia, where no area differences in MHP were observed, it may still be relevant to target public health strategies aimed at mental well-being at the community level in any type of neighbourhood.

Moreover, our findings need replication regarding differences between the CE and WE countries to assess whether area-effects on health of residents indeed differ that much between these settings.

5. Conclusion

Our study revealed differences in associations of mental health problems in deprived areas regarding unemployment in the Netherlands and in Slovakia. The overall prevalence of mental health problems was similar in both countries, but in the Netherlands mental health problems occurred more frequently in socio-economically disadvantaged areas regarding unemployment, whereas in Slovakia a flat pattern was observed. Individual-level socioeconomic characteristics did not explain area differences. In conclusion, our results suggest that area-level and individual-level socioeconomic characteristics operate differently in Central European countries compared with Western European countries.

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