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REVIEW

Poorer self-perceived health among migrants and ethnic minorities versus the majority population in Europe: a systematic review

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Abstract
Objectives Knowledge about self-perceived health can help us understand the health status and needs among migrants and ethnic minorities in the European Union (EU) which is essential to improve equity and integration. The objective was to examine and compare self-perceived health among migrant and ethnic minority groups in the EU countries.
Methods Publications were ascertained by a systematic search of PUBMED and EMBASE. Eligibility of studies was based on the abstracts and the full texts. Additional articles were identified via the references. The final number of studies included was 17.
Results Publications were identified in 5 out of the 27 EU countries. In regard to self-perceived health, most migrants and ethnic minority groups appeared to be disadvantaged as compared to the majority population even after controlling for age, gender, and socioeconomic factors. Only limited cross-country comparisons could be carried out, still they revealed a parallel pattern of self-perceived health among similar migrant/ethnic minority groups.
Conclusions Policies to improve social and health status, contextual factors, and access to healthcare among migrants and ethnic minorities are essential to reduce ethnic inequalities in health.

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Introduction

Understanding the health status and needs of migrants and ethnic minorities in the European Union (EU) is crucial for several reasons. First, the right to the highest attainable health is a fundamental human right (World Health Organisation 1946) which constitutes one of the underlying values in the EU together with the principle of equity in health (Padilla and Miguel 2007). Second, EU has highlighted the importance of equity, social cohesion, and growth which has put migrant and ethnic minority health on the agenda (Padilla and Miguel 2007). Third, migrants and ethnic minorities constitute approximately 64.1 million equivalent to 9% of the total population in the EU (United Nations 2009); thus, contributing significantly to the health status of the European countries.

Self-perceived health is one of the internationally leading health indicators reflecting a person's subjective general perception of health. There is a sturdy evidence base to support that self-perceived health is a strong, independent, and reliable predictor of morbidity (Kaplan et al. 1996), healthcare utilization (Fylkesnes 1993), and mortality (Idler and Benyamini 1997; Kaplan et al. 1996). On this basis, it has also been used as a proxy for health needs (Hjern et al. 2001; Stronks et al. 2001). Hence, it has been suggested that self-perceived health may capture the holistic health perception, including the physical, mental, and social well-being using individual criteria (Idler and Benyamini 1997). Likewise, ethnic differences in self-perceived health have proved to be a strong predictive indicator for subsequent mortality differences (Lindstrom et al. 2001).

The effect on health of being a migrant and ethnic minority has caused debates as some studies have shown that minority groups enjoy better health compared with the majority population (Fang et al. 1996; Wild and McKeigue 1997), whereas other studies have found worse health among these groups (Stirbu et al. 2006; Villadsen et al. 2009). Yet, it is important to bear in mind that migrants and ethnic minorities constitute heterogeneous groups with respect to their ethnic features, historical roots, culture, and practices concerning health. Also, several factors may influence the health of the minority population such as factors in the country of origin, including cultural background (e.g. early life risk factors, diet); factors related to the act of migration (forced or voluntary); factors during the migration process; socioeconomic factors in the host country (e.g. poor socioeconomic conditions, loss of social status); and selection effects such as the 'healthy migrant effect' (Fang et al. 1996). An overview of self-perceived health among migrants and ethnic minorities applied in the EU member states might nuance the debate. Additionally, comparisons across the EU are pertinent for evidence-based health policies for migrants and ethnic minorities and also due to the fact that the EU member states face similar challenges pertaining to health and migration.

In recognition of the knowledge breach of migrant health in the EU which can be ascribed to the challenges of studying migrants and ethnic minorities due to conceptual, methodological, ethical, and practical issues, the European Commission funded the Migrant and Ethnic Health Observatory (MEHO) project to identify sources of information and to generate a European overview of different health issues among migrants and ethnic minorities (MEHO 2009). This paper is part of the work and it is the first of its kind to review self-perceived health among migrants and ethnic minorities in the EU.

The objective of this study was to (1) describe the existing scientific literature regarding self-perceived health among migrant and ethnic minority groups compared with the majority population in the EU, (2) examine similarities and variations regarding self-perceived health between different migrant/ethnic minority groups and the majority population, and (3) compare self-perceived health among similar migrant and ethnic minority groups with the majority population across the EU countries.

Methods

The terminology regarding migrants and ethnic minorities is ambiguous and no universal definition for categorizing has been agreed on. Which terms are applied to a certain extent reflects the socio-political history of migration in different countries. To allow for inclusion of both migrants and ethnic minorities, we employed the following definition of migrants developed by the MEHO-partners: "A migrant is any person who migrated to the current EU-27 countries from outside the EU-15 member states (the 15 EU member states before the expansion in 2004), while further excluding North America and Australasia but including the post World War II guest workers from the Southern European countries periphery (e.g. Italy, Greece, and Turkey) and re-settlers from the former countries of the Soviet Union, and is staying as a resident (not a visitor, asylum seeker, temporary worker or student)" (MEHO 2009) as well as the following definition of ethnic groups: "The social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race" (Bhopal 2004). To operationalize the latter definition in this context, the ethnic minority groups in Europe are distinguished from the ethnic majority group who has ancestral origins in Europe.

As defined by the European Community Health Indicators Monitoring: "Self-perceived health is a subjective assessment that the people make about one's own health state, more commonly called subjective health or self-perceived health. Subjective health is a global measurement including several health dimensions (physical, social and emotional). It is influenced by the presence of symptoms or specific complaints and by the diagnosis made by a physician of a possible disease. The reference is to health in general rather than the present state of health, as the question is not intended to measure temporary health problems. It omits any reference to age and it is not time limited" (European Community Health Indicators Monitoring 2008). In questionnaires, the measure is commonly phrased as: "In general, would you say your health is: excellent; very good; good; fair; or poor?" This understanding of the term was used to narrow the search strategy.

Relevant publications were identified by: (a) a systematic search of PUBMED and EMBASE, (b) scanning the references of identified publications, and (c) searching the authors' own files. The PUBMED and EMBASE search was based on: [Self-perceived health OR self-assessed health OR self-reported health OR self-rated health OR health status] AND Minority Groups [Mesh] OR [transients OR migrants OR immigrants OR ethnic groups OR emigration and immigration OR cultural diversity OR cross-cultural comparison OR cultural characteristics] in combination with all EU countries applying the limitations: published in the last 10 years, only articles in English, Danish, Swedish, and study population aged 19+ years. In July 2009, this resulted in 1,119 publications in PUBMED and 33 publications in EMBASE; the latter without employing language or age limits.

Our inclusion criteria were: all publications had to be original, quantitative, peer-reviewed studies undertaken in the EU countries investigating self-perceived health by adult migrants or ethnic minorities with permanent residence permit. Additionally, the majority should serve as reference group, and the majority and minority group should originate from the same source population. Exclusion criteria were: publications only focusing on specific diseases which make comparisons difficult due to different definitions and selections of target groups.

Eligibility of the studies was based on a screening of the titles; this resulted in 37 potential relevant studies from PUBMED and 5 potential relevant studies from EMBASE. The abstracts of these studies were read; exclusion happened when one or more criteria were not met. All remaining studies were judged based on the full text following the same procedure, this resulted in 14 relevant articles from PUBMED and 0 from EMBASE. Additional searches were conducted via the references of the selected articles which allowed for two other articles. Also, relevant articles that we learned about otherwise were included (1 article). The final number of studies included in the review was 17 (Fig. 1).

Results

Table 1 summarizes the characteristics of the included studies. The 17 studies were carried out in five countries situated in different parts of Europe: in Northern Europe: Sweden (11), United Kingdom (3); in Central Europe: Belgium (1), The Netherlands (1); and in Southern Europe: Spain (1). None was carried out in Eastern Europe.

The number of migrants and ethnic minorities included in the studies differed from 111 to 121,401 persons with 7/17 (41%) of the studies involving more than 1,000 individuals from migrant and ethnic minority groups. Identification of migrants and ethnic minorities by country of birth was predominant (13/17) as compared to citizenship (1/17) and self-identification (3/17). This mainly mirrors the fact that most studies were conducted in Sweden where country of birth is most commonly used as an indicator of migrant status in contrast to, e.g. United Kingdom (UK) where self-identification is most commonly used. The migrant and ethnic minority groups as well as the categories of migrants and ethnic minorities used varied substantially in the studies with migrants from Turkey and Poland (4/17) being the most frequently studied and

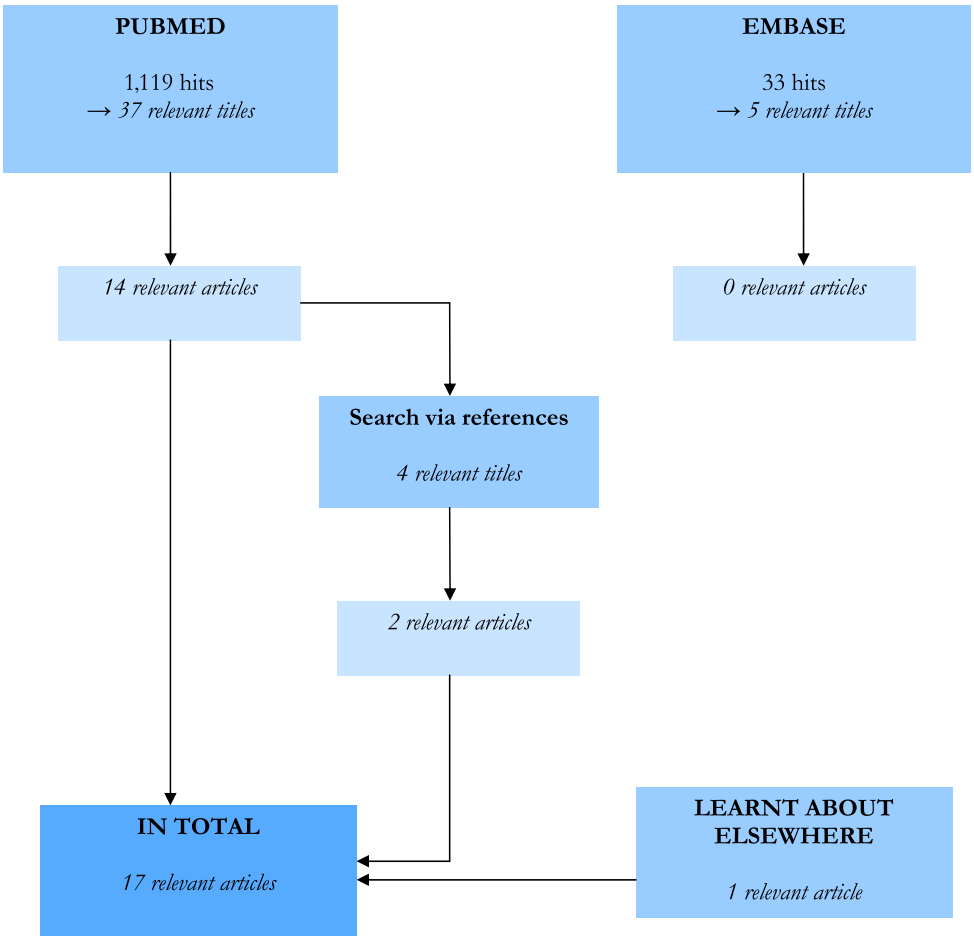

Fig. 1 Selection process

Table 1 Description of the included studies on self-perceived health among migrants and ethnic minorities in the EU countries

	Number of studies	
	$N = 17$	%
Host countries		
Belgium	1/17	6
The Netherlands	1/17	6
Spain	1/17	6
Sweden	11/17	61
United Kingdom	3/17	18
Characteristics of migrants/ethnic minorities in the studies		
Number of migrants/persons of ethnic minority		
>1,000	7/17	41
<1,000	10/17	59
Identification of migrant/ethnic minority status		
Country of birth	13/17	76
Citizenship	1/17	6
Self-identification	3/17	18
Migrant/ethnic group		
Antilles	1/17	6
Bangladesh	3/17	18
Black Caribbean	2/17	12
Chile	1/17	6
East Europe	2/17	12
Former Soviet Union	1/17	6
India	3/17	18
Iran	3/17	18
Kurdish ethnicity	2/17	12
Morocco	2/17	12
Pakistan	3/17	18
Poland	4/17	24
Surinam	1/17	6
Turkey	4/17	24
Yugoslavia	1/17	6
Foreign born	3/17	18
Arabic-speaking countries	1/17	6
Developing countries	1/17	6
Refugees	2/17	12
Information on type of migration		
Yes	4/17[a]	24
No	13/17	76
Methodological characteristics		
Study design		
Interviews	14/17	82
Postal questionnaires	3/17	18
Translation assistance		
Yes	11/17	65
No information	6/17	35
Non-response rate (%)		
≤20	4/17	24
21 ≥ 30	3/17	18
31 ≥ 40	5/17	29
No information	5/17	29
Representativeness of the study population		
National representativeness	12/17	67
Regional or local representativeness	5/17	33
Adjustment		
Age	15/17	88
Sex	13/15[b]	87
Socioeconomic status	13/17	76
Time in host country since immigration	1/17	6
Other	11/17	65
Distinction between first generation and second generation migrants		
Yes	1/17	6
No	16/17	94

[a] In one of the studies, refugee status is assessed by country of birth (refugee-producing countries) and not by actual information

[b] $N = 15$ as studies which only concern a specific sex are not included

foreign-born (3/17) as the most frequent group category used. Again, this mainly reflects the size of the groups in the five countries as well as the number of studies carried out in these countries. Regarding type of migration (e.g. refugee vs. labour-migrant), some sort of information was available in 4/17 of the studies.

The data collections occurred through interviews (14/17) and postal questionnaires (3/17). Translation assistance in the form of professional interpreters, bilingual interviewers, translated questionnaires, or the use of family members was reported in 11 studies. The non-response rate was reported in 12/17 of the studies with a most frequent reported rate of 31 ≥ 40%. Seven of the studies explicitly mentioned the non-response rate for the migrant and ethnic minority groups and for the majority population, respectively.

Two-thirds of the studies comprised a national representative population (12/17) whereas one-third comprised a regional or local representative population (5/17). Regarding risk adjustment, age was adjusted for in 15/17 studies, sex in 13/15 studies that included both men and women, socioeconomic status such as education, employment status, and occupational social class in 13/17, time in host country in 1/17, and other factors such as marital status and contextual factors (e.g. environmental hazards, socio-economic segregation) in 11/17 studies. One of the studies distinguished between first and second generation migrants.

Most of the included studies employed country of birth as identification of migrants/ethnic minorities and adjusted for age, sex, and socioeconomic factors as a minimum (Table 1). Therefore, it was feasible to provide an overall picture of the self-perceived health of migrants/ethnic minorities in the EU (Table 2), examine similarities and variations between different migrant/ethnic minority groups (Table 3) and carry out some cross-country comparisons of similar groups of migrants and ethnic minorities (Table 4).

Regarding self-perceived health, overall, migrants/ethnic minorities seemed to be disadvantaged as compared to the majority population (Table 2). Even after risk adjustments of age, sex, and socioeconomic factors, migrants and ethnic minorities still reported a worse health compared with the majority population in most studies (Borrell et al. 2008; Chandola 2001; Cooper 2002; Hjern et al. 2001; Iglesias et al. 2003; Koochek et al. 2007; Leao et al. 2009; Lindstrom et al. 2001; Lorant et al. 2008; Mohseni and Lindstrom 2008; Pudaric et al. 2003; Stronks et al. 2001; Sungurova et al. 2006; Taloyan et al. 2006, 2008; Wiking et al. 2004), although differences were seen in relation to country of birth (Chandola 2001; Lindstrom et al. 2001; Mohseni and Lindstrom 2008; Pudaric et al. 2003; Stronks et al. 2001) and sex (Borrell et al. 2008; Cooper 2002; Iglesias et al. 2003; Lindstrom et al. 2001; Mohseni and Lindstrom 2008). For instance, Borell et al. (2008) found that foreign-born men but not women had a worse self-rated health (odds ratio 2.16) as compared with native-born Catalonian and that the poor health status found among foreign-born men was not explained by social class or working and living conditions. In contrast, Cooper (2002) found that socioeconomic inequality could account for a sizeable proportion of the health disadvantage experienced by ethnic minorities in the UK although differences still remained. In Sweden, Wiking et al. (2004) found that the strong association between ethnicity and poor self-reported health seemed to be mediated by socioeconomic status, poor acculturation, and discrimination. In another Swedish study, Lindstrom et al. found significant ethnic group differences in self-reported health after controlling for age, sex, and education but that the differences were greatly reduced after controlling for social network, social support, and economic factors. This suggests that these factors may be important determinants of self-rated health in certain minority groups (Lindstrom et al. 2001). When including adjustment for contextual features, such as local unemployment rate and perceived lack of public services, as well, findings from Lorant et al. (2008) showed that migrants from Turkey and Morocco and other countries were less likely to have poor self-rated health compared with native-born Belgium (odds ratios of migrants ranging from 0.54 to 0.81). Chandola (2001) showed similar results in the United Kingdom (UK).

Table 3 provides an overview of similarities and differences of self-perceived health of different migrant and ethnic minority groups compared to the majority population. From the current evidence, Bangladeshi, black Caribbeans, Indians, and Pakistani residing in the UK had a worse self-perceived health as compared to white (Chandola 2001; Cooper 2002) or a similar self-perceived health for Bangladeshi and black Caribbean versus white (Cooper 2002). One study showed that after supplementary adjustment of contextual factors no ethnic differences remained (Chandola 2001). Migrants from Chile, East European countries, including Poland, Former Soviet Union, Iran, Surinam, Morocco, Turkey, and persons with Kurdish ethnicity all showed a generally worse self-perceived health compared with the native-born (Hjern et al. 2001; Koochek et al. 2007; Lindstrom et al. 2001; Lorant et al. 2008; Pudaric et al. 2003; Sungurova et al. 2006; Taloyan et al. 2006, 2008; Wiking et al. 2004). In contrast, migrants from the Antilles in the Netherlands showed similar self-rated health as compared to the majority population (Stronks et al. 2001). After adjusting for contextual features, social network/support and socio-economic variables, migrants from Morocco, Turkey, and Former Yugoslavia had similar or better self-perceived health compared with the native-born (Lindstrom et al. 2001; Lorant et al. 2008).

In three of the six countries, namely Belgium, The Netherlands, and Sweden, a few of the same migrant/ethnic groups (Turkish and Moroccans) have been investigated which allow for cross-country comparisons to some extent (Table 4). After risk adjustment of age, gender, and socioeconomic factors, a disadvantaged health position of Turkish migrants in all three countries (Hjern et al. 2001; Lorant et al. 2008; Stronks et al. 2001; Wiking et al. 2004) and of Moroccan migrants in Belgium and The Netherlands (Lorant et al. 2008; Stronks et al. 2001) was shown.

Discussion

Most migrants and ethnic minority groups appeared to be disadvantaged in regard to self-perceived health as compared to the majority population even after controlling for age, sex, and socioeconomic factors. Also, migrants and ethnic minorities seem to face a triple burden with the negative effects of ethnic minority status, low social position, and poor contextual factors. Another significant finding was that not all minority groups bore a similar risk of poor self-perceived health which emphasizes the importance to carry out separate analyses for different minority groups. However, our findings suggest that

Table 2 Studies included in the review by self-perceived health indicator ($N = 17$)

Authors and source Country	Sample and number of migrants/ethnic minorities	Migrant/ethnicity categories	Migrant status	Risk of poor self-rated health
Leao et al. (2009) Sweden	National sample of young adults (16–34 years) $N = 1,340$	All other countries[f]	Labour migrants and refugees (both first and second generations)	Compared with native-born individuals with two parents born in Sweden: *First generation*: Labour migrants: OR 1.49 (1.02–2.20)[a,b,c,e] Refugees: OR 2.49 (2.11–2.92)[a,b,c,e] *Second generation*: One Swedish parent: 1.34 (1.12-1.60)[a,b,c,e] Labour migrants: OR 1.05 (0.67-1.64)[a,b,c,e] Refugees: OR 0.97 (0.34-2.73)[a,b,c,e]
Borrell et al. (2008) Spain	Adults residing in Barcelona (16–64 years) $N = 162$	Other countries[f]	No information	Compared with native-born Catalonian: Foreign-born men: OR 2.16 (1.14–4.10)[b,c,e] Foreign-born women: OR 1.15 (0.59–2.23)[b,c,e]
Lorant et al. (2008) Belgium	National sample of adults (15–64 years) $N = 121,401$	Turkey Morocco Other countries (non-Western)[g]	No information	Compared with native-born: Turks/Moroccans: OR 2.25 (2.22–2.29)[a,b] Other: OR 0.97 (0.94–1.00)[a,b] After adjusting for contextual features and socio-economic variables: Turks/Moroccans: OR 0.81 (0.80–0.82)[a,b,c,e] Other: OR 0.54 (0.53–0.56)[a,b,c,e]
Mohseni and Lindstrom (2008) Sweden	Adults residing in the region Skåne (18–80 years) $N = 730$	Middle East and North Africa, the rest of Africa, the rest of Asia, Latin America)[f]	No information	Compared with native-born: *Men* Middle East/North Africa: OR 2.2 (1.6–3.2)[b,c,e] Rest of Africa: OR 0.6 (0.2–2.0)[b,c,e] Rest of Asia: OR 1.1 (0.6–2.1)[b,c,e] Latin America: OR 1.8 (0.9–3.7)[b,c,e] *Women* Middle East/North Africa: OR 1.3 (0.9–1.9)[b,c,e] Rest of Africa: OR 1.1 (0.4–2.7)[b,c,e] Rest of Asia: OR 1.5 (1.0–2.2)[b,c,e] Latin America: OR 1.4 (0.8–2.6)[b,c,e]
Taloyan et al. (2008) Sweden	National sample of adults (27–60 years) $N = 197$	Kurdish ethnicity (born in Iran or Turkey)[f]	(a) Family unification (b) Political/religious persecution (c) Pursuing studies and employment	In total, 37.6% of Kurds had reported poor self-rated health, in comparison with 18.0% of Swedes

Table 2 continued

Authors and sourceCountry	Sample and number of migrants/ethnic minorities	Migrant/ethnicity categories	Migrant status	Risk of poor self-rated health
Koochek et al. (2007) Sweden	Elderly Iranian residing in the township Kista, Stockholm (60–84 years) $N = 176$	Iran[f]	No information	Compared with native-born: Iranian men immigrated in 1988 or earlier: β-coefficient 1.7 (−7.2–10.6)[b,c] Iranian men immigrated in 1989 or later: β-coefficient 5.3 (−4.2–14.8)[b,c] Iranian women immigrated in 1988 or earlier: β-coefficient 5.0 (−2.0–12.3)[b,c] Iranian women immigrated in 1989 or later: β-coefficient 0.6 (−5.4–6.6)[b,c]
Sungurova et al. (2006) Sweden	National sample of adults (25–84 years) $N = 373$	Poland Other East European (a composite of Hungary, Bulgaria, Czech Republic, Slovakia, and Romania) Former Soviet Union[f]	No information	Compared with native-born: Poland: OR 1.75 (1.26–2.44)[a,b,c,e] Other East Europe: OR 1.65 (1.19–2.29)[a,b,c,e] Former Soviet Union: OR 2.21 (1.26–3.87)[a,b,c,e] In additional analyses which excluded native-born respondents, years in host country[d] and language spoken at home did not influence the association between being born in Poland, other Eastern Europe, or Former Soviet Union and poor self-reported health
Taloyan et al. (2006) Sweden	National sample of adult men (27–60 years) $N = 111$	Kurdish ethnicity (born in Iran or Turkey)[f]	(a) Family unification (b) Political/religious persecution (c) Pursuing studies and employment and other	Compared with Swedes (excluding first and second-generation immigrants): Kurdish men: OR 2.09 (1.20–3.64)[b,c,e]
Wiking et al. (2004) Sweden	National sample of adults (27–60 years) $N = 2,160$	Poland Turkey Iran[f]	No information	Compared with native-born: *Men* Poland: OR 1.72 (1.10–2.69)[b,c,e] Turkey: OR 2.61 (1.84–3.72)[b,c,e] Iran: OR 2.92 (1.96–4.35)[b,c,e] *Women* Poland: OR 1.90 (1.42–2.53)[b,c,e] Turkey: OR 3.13 (2.18–4.51)[b,c,e] Iran: OR 4.25 (2.74–6.60)[b,c,e]
Iglesias et al. (2003) Sweden	National sample of adult women (20–49 years) $N = 620$	Refugees[f]	(a) Labour migrants from Western countries (b) Refugees	Compared with native-born: Refugee women: OR 1.81 (1.47–2.21)[b,c,e]

Table 2 continued

Authors and sourceCountry	Sample and number of migrants/ethnic minorities	Migrant/ethnicity categories	Migrant status	Risk of poor self-rated health
Pudaric et al. (2003) Sweden	National sample of elderly (55–74 years) $N = 170$	Eastern Europe Developing countries[f]	No information (most likely to be refugees)	Compared with native-born: Eastern Europe: OR 2.28 (1.25–4.16)[a,b,c,e] Developing countries: OR 1.86 (0.91–9.05)[a,b,c,e]
Cooper (2002) United Kingdom	National sample of adults (20–60 years) $N = 1,965$	Black Caribbean India Pakistan Bangladesh[h]	No information	Compared with white men: Black Caribbean men: OR 1.15 (not statistically significant)[b,c] Black Caribbean women: OR 1.98 (statistically significant)[b,c] Indian men: OR 1.50 (statistically significant)[b,c] Indian women: OR 1.70 (statistically significant)[b,c] Pakistani men: OR 1.52 (statistically significant)[b,c] Pakistani women: OR 1.68 (statistically significant)[b,c] Bangladeshi men: OR 1.56 (not statistically significant)[b,c] Bangladeshi women: OR 1.05 (not statistically significant)[b,c]
Chandola (2001) United Kingdom	National sample of adults (16+ years) $N = 3,039$	India Pakistan/Bangladesh[h]	No information	Compared to whites: Indian: log odds 0.23 (0.01*)[a,b] Pakistani/Bangladeshi: log odds 0.59 (0.10*)[a,b] After adjusting for contextual features and socio-economic variables: Indian: log odds −0.01 (0.10*)[a,b,c,e] Pakistani/Bangladeshi: log odds 0.08 (0.11*)[a,b,c,e]
Hjern et al. (2001) Sweden	National sample of adults (27–60 years) $N = 1,890$	Chile Poland Turkey Iran[f]	No information	In total, 8.4% of Polish, 14.9% of Chilean, 16.6% of Turkish and 15% of Iranian reported poor/very poor self-rated health, in comparison with 2.7% of native-born

Table 2 continued

Authors and sourceCountry	Sample and number of migrants/ethnic minorities	Migrant/ethnicity categories	Migrant status	Risk of poor self-rated health
Lindstrom et al. (2001) Sweden	Adults residing in Malmö (20–80 years) $N = 718$	Yugoslavia Poland Arabic-speaking countries All other countries[f]	No information	Compared to native-born: *Men* Yugoslavia: OR 2.68 (1.50–4.80)[b,c] Poland: OR 1.40 (0.64–3.07)[b,c] Arabic-speaking countries: OR 3.80 (2.02–7.15)[b,c] All other countries: OR 2.81 (1.85–4.27)[b,c] *Women* Yugoslavia: OR 2.35 (1.37–4.05)[b,c] Poland: OR 3.56 (2.11–5.98)[b,c] Arabic-speaking countries: OR 1.47 (0.62–3.46)[b,c] All other countries: OR 2.20 (1.48–3.29)[b,c] After adjusting for social participation, social anchorage in neighbourhood, and social support and economic factors: *Men* Yugoslavia: OR 1.44 (0.74–2.79)[b,c,e] Poland: OR 1.34 (0.60–3.02)[b,c,e] Arabic-speaking countries: OR 1.10 (0.52–2.34)[b,c,e] All other countries: OR 1.61 (1.01–2.57)[b,c,e] *Women* Yugoslavia: OR 1.59 (0.87–2.91)[b,c,e] Poland: OR 2.27 (1.29–4.00)[b,c,e] Arabic-speaking countries: OR 0.55 (0.21–1.45)[b,c,e] All other countries: OR 1.15 (0.73–1.81)[b,c,e]
Stronks et al. (2001) The Netherlands	Adult population residing in Amsterdam (16–64 years) $N = 378$	Turkey Antilles Morocco Surinam[f]	No information	In total, 29.6% of Surinamese[a,b], 17.8% of Antillean[a,b] (not statistically significant different), 48.4% of Turkish[a,b] and 41.7% of Moroccan[a,b] reported less than good self-rated health, in comparison with 22.5% of native-born[a,b]

Table 2 continued

Authors and sourceCountry	Sample and number of migrants/ethnic minorities	Migrant/ethnicity categories	Migrant status	Risk of poor self-rated health
Chandola and Jenkinson (2000)	National sample of adult population (45–64 years)	Black Caribbean Indian	No information	Compared to white (OR approximation by SSN based on figure presented in article): Black Caribbean: OR approx. 3.2 (approx. 2.3–4.3)[a,b] Indian: OR approx. 2.1 (approx. X-2.8)[a,b]
United Kingdom	N = approx. 1,272	Pakistan/Bangladesh[h]		Pakistani/Bangladesh[a,b]: OR approx. 4.1 (approx. 2.9–6.2)[a,b]

* Standard error

[a] Adjusted for sex

[b] Adjusted for age

[c] Adjusted for socioeconomic factor(s)

[d] Adjusted for time in host country

[e] Adjusted for other factors (e.g. degree of urbanization, marital status)

[f] Migrant/ethnicity status is based on country or region of birth

[g] Migrant/ethnicity status is based on citizenship

[h] Migrant/ethnicity status is based on self-assessment

whether minorities are identified by migrant status or ethnic minority group does not seem to affect the likelihood of showing differences in self-perceived health between the minority and majority population.

Only limited cross-country comparisons could be carried out, still they revealed a parallel pattern of self-perceived health among similar migrant and ethnic groups implying either that the conditions in the selected EU host countries are similar or that the conditions do not seem to notably influence the relative differences of self-perceived health between the minority and the majority population.

Although the disadvantaged patterns for migrants and ethnic minorities were clear, studies were only identified in five EU countries which underscore the great lack of quality studies and knowledge within this field in Europe. A consolation is, though, the relative consensus in the studies regarding similar measures of self-perceived health, similar identification of migrants and ethnic minorities to some extent, as well as similar risk adjustments. However, this can mainly be ascribed to the fact that the majority of studies were carried out in the same country (Sweden), which entail a tendency to standardized methods and material approaches.

This review faces some methodological shortages. First, our strict inclusion criteria of original, quantitative, peer-reviewed studies lead to the overlook of relevant documentation on this topic published in reports, books, and websites. Several relevant studies carried out by national, regional and local health authorities, institutes and organisations do exist in Europe, but they have not been reported in recognized scientific journals and are therefore not identified in a systematic review of this kind. Further identification of such studies might add to the international knowledge base regarding the health of migrants and ethnic minorities. This could be part of future research activities involving health authorities and local research institutions in each EU country. This, however, would face challenges regarding language, quality and available resources and was not feasible in the present study. Second, the first screening for eligibility of the studies was based on the titles only which may result in a failure to notice some relevant articles. Third, only articles published in English, Danish, and Swedish were considered for the review; thus, relevant studies published in other languages would have been excluded. Fourth, we limited our search to publications from the last 10 years to focus on the most current results, acknowledging that results published earlier could have contributed to the overall picture.

As shown in Table 1, basic confounders such as age and sex were not included in all identified studies. Unadjusted results are problematic, especially for comparison purposes between migrants/ethnic minorities and the majority population, between migrant/ethnic groups as well as between

Table 3 Self-perceived health by migrant and ethnic group compared to the majority populations ($N = 17$)

Migrant/ethnic group	Major findings (compared with majority population)
Antilles	No significant differences[a,b] (Stronks et al. 2001, The Netherlands)
Bangladesh	No significant differences[a,b,c] (Cooper 2002, United Kingdom)
	No significant differences after adjusting for social class, local area deprivation and standard of living[a,b,c,d] (Chandola 2001, United Kingdom)
	Poorer health [OR approx. 4.2 (approx. 2.9–6.2)[a,b]] (approximation by SSN based on figure presented in article) (Chandola and Jenkinson 2000, United Kingdom)
Black Caribbean	No significant differences among men but poorer health among women[a,b,c] (Cooper 2002, United Kingdom)
	Poorer health [OR approx. 3.2 (approx. 2.3–4.1)[a,b]] (approximation by SSN based on figure presented in article) (Chandola and Jenkinson 2000, United Kingdom)
Chile	Poorer health (in total, 14.9% of Chilean, reported poor/very poor self-rated health, in comparison with 2.7% of Swedes) (Hjern et al. 2001, Sweden)
East European countries	Poorer health [OR 1.65 (1.19–2.29)[a,b,c,d]] (Sungurova et al. 2006, Sweden); [OR 2.28 (1.25–4.16)[a,b,c,d]] (Pudaric et al. 2003, Sweden)
Former Soviet Union	Poorer health [OR 2.21 (1.26–3.87)[a,b,c,d]] (Sungurova et al. 2006, Sweden)
India	Poorer health (men: OR 1.50[b,c], women: OR 1.70[b,c]) (Cooper 2002, United Kingdom); [OR approx. 2.1 (approx. X–2.8)[a,b]] (approximation by SSN based on figure presented in article) (Chandola and Jenkinson 2000, United Kingdom)
	No significant differences after adjusting for social class, local area deprivation and standard of living[a,b,c,d] (Chandola 2001, United Kingdom)
Iran	Poorer health [men: OR 2.92 (1.96–4.35)[b,c,d], women: OR 4.25 (2.74–6.60)[b,c,d]] (Wiking et al. 2004, Sweden); 15% of Iranian reported poor/very poor self-rated health, in comparison with 2.7% of Swedes (Hjern et al. 2001, Sweden); [men immigrated in 1988 or earlier: β-coefficient 1.7 (−7.2–10.6)[b,c], men immigrated in 1989 or later: β-coefficient 5.3 (−4.2–14.8)[b,c], women immigrated in 1988 or earlier: β-coefficient 5.0 (−2.0–12.3)[b,c], women immigrated in 1989 or later: β-coefficient 0.6 (−5.4–6.6)[b,c]] (Koochek et al. 2007, Sweden)
Kurdish ethnicity (born in Iran or Turkey)	Poorer health (in total, 37.6% of Kurds had reported poor self-rated health, in comparison with 18.0% of Swedes) (Taloyan et al. 2008); [men: OR 2.09 (1.20–3.64)[b,c,d]] (Taloyan et al. 2006, Sweden)
Morocco	Better health after adjusting for contextual features and socio-economic variables [OR 0.81 (0.80–0.82)[a,b,c,d]] (Lorant et al. 2008, Belgium)
	Poorer health: (41.7%[a,b] of Moroccan reported less than good self-rated health, in comparison with 22.5%[a,b] of native-born) (Stronks et al. 2001, The Netherlands)
Pakistan	Poorer health (men: OR 1.52[b,c], women: OR 1.68[b,c]) (Cooper 2002, United Kingdom); [OR approx. 4.2 (approx. 2.9–6.2)[a,b]] (approximation by SSN based on figure presented in article) (Chandola and Jenkinson 2000, United Kingdom)
	No significant differences after adjusting for social class, local area deprivation and standard of living[a,b,c,d] (Chandola 2001, United Kingdom)
Poland	Poorer health [OR 1.75 (1.26–2.44)[a,b,c,d]] (Sungurova et al. 2006, Sweden); [men: OR 1.72 (1.10–2.69)[b,c,d], women: OR 1.90 (1.42–2.53)[b,c,d]] (Wiking et al. 2004, Sweden); 8.4% of Polish reported poor/very poor self-rated health, in comparison with 2.7% of Swedes (Hjern et al. 2001, Sweden)
	No significant differences among men but significant poorer among women[a,b,c]. When adjusting from social network, social support and economic factors, poor self-rated health among women born in Poland remained significant higher [OR 2.27 (1.29–4.00)[a,b,c,d]] (Lindstrom et al. 2001, Sweden)
Surinam	Poorer health (29.6% of Surinamese[a,b] reported less than good self-rated health, in comparison with 22.5%[a,b] of native-born) (Stronks et al. 2001, The Netherlands)
Turkey	Poorer health [men: OR 2.61 (1.84–3.72)[b,c,d], women: OR 3.13 (2.18–4.51)[b,c,d]] (Wiking et al. 2004, Sweden); (48.4% of Turkish[a,b] reported less than good self-rated health, in comparison with 22.5% of native-born[a,b]) (Stronks et al. 2001, The Netherlands); 16.6% of Turkish reported poor/very poor self-rated health, in comparison with 2.7% of Swedes (Hjern et al. 2001, Sweden).
	Better health after adjusting for contextual features and socio-economic variables [OR 0.81 (0.80–0.82)[a,b,c,d]] (Lorant et al. 2008, Belgium)
Yugoslavia	No significant differences when adjusting for social network, social support and economic factors[a,b,c,d] (Lindstrom et al. 2001, Sweden)

[a] Adjusted for sex

[b] Adjusted for age

[c] Adjusted for socio-economic factor(s)

[d] Adjusted for other factors (e.g. degree of urbanization, marital status)

Table 4 Poor self-perceived health among selected migrant and ethnic groups compared to the majority populations by EU country ($N = 4$)

Country	Authors and source	Sample and number of migrants	Country of origin	Migrant status	Major findings (compared with native-born)
Belgium	Lorant et al. (2008)	National adult (15–64 years) $N = 121{,}401$	Turkey Morocco	No information	Among non-European migrant groups, Turks and Moroccans had the highest risk [OR 2.25 (2.22–2.29)[a,b]]. After adjusting for contextual features and socio-economic variables, migrants from Turkey and Morocco were less likely to have poor self-rated health [OR 0.81 (0.80–0.82)[a,b,c,d]]
Netherlands	Stronks et al. (2001)	Adult population residing in Amsterdam (16–64 years) $N = 378$	Turkey Morocco	No information	Poorer health among migrants from Turkey and Morocco[a,b]. In total, 48.4% of Turkish[a,b] and 41.7%[a,b] of Moroccan migrants reported less than good self-rated health, in comparison with 22.5%[a,b] of native-born
Sweden	Wiking et al. (2004)	National adults (27–60 years) $N = 2{,}160$	Turkey	No information	Poorer health among Turkish migrants [men: OR 2.61 (1.84–3.72)[b,c,d]; women: OR 3.13 (2.18–4.51)[b,c,d]] compared with native-born
	Hjern et al. (2001)	National adults (27–60 years) $N = 1{,}890$	Turkey	No information	Poorer health among migrants from Turkey (in total, 16.6% of Turkish reported poor/very poor self-rated health, in comparison with 2.7% of native-born)

[a] Adjusted for sex

[b] Adjusted for age

[c] Adjusted for socio-economic factor(s)

[d] Adjusted for other factors (e.g. degree of urbanization, marital status)

countries. As migrants tend to be younger and also often socioeconomically disadvantaged compared with the majority population the unadjusted results often draw a wrongful picture of migrants'/ethnic minorities' health status when compared with other population groups. To assure comparability of data and quality of results, age, sex and socio-economic status should at least be taken into account in the analyses.

The review illustrated that social, cultural, and economic factors could explain a significant part but not the full association between poor self-perceived health and migrant status/ethnicity. Adding contextual factors as explanatory variable seemed to attenuate the difference in self-perceived health between the groups which also has been shown in an American context (Cagney et al. 2005). To highlight the underlying factors, including the causes of the causes, analyses incorporating both individual and neighbourhood-level contextual factors may further our understanding of the complex association between ethnicity and health.

Although self-assessed health has been shown to be linked to mortality, poorer self-assessed health among migrants does not always correspond to higher mortality. Some migrant groups, e.g. Moroccan migrants, report poorer health (Stronks et al. 2001) but enjoy a lower mortality compared to the majority population (Bos et al. 2004; Stirbu et al. 2006). This paradox, however, is identified only on the basis of findings from separate studies and could therefore be explained by differences in the selection of study populations in these studies. Yet, there might be other plausible explanations. First, migrants seem to have a different disease pattern than the majority population, e.g. migrants suffer to a greater extent from chronic illnesses (back pain, arthritis) and conditions harming the quality of life (e.g. depression) but less fatal diseases such as cancer (Singhammer 2008). Second, migrants might die of other causes of mortality (Stirbu et al. 2006) which do not have the same relation to self-perceived health. Third, migrants may assess self-perceived health differently compared with the majority population (Agyemang et al. 2006).

Despite the fact that substantial research demonstrate that self-rated health provides valid and reliable data, some researchers have claimed that self-perceived health is an imprecise measure of health and that the reference point assessment of self-perceived health is not absolute and varies with demography and social context. However, a longitudinal Swedish study with 170,223 subjects demonstrated that the absolute mortality risk differences between persons reporting poor and good self-rated health were similar across socioeconomic groups within each gender (Burstrom and Fredlund 2001) which support the usefulness of the health measure as a subsequent mortality predictor among different socioeconomic groups. Regarding the validity of cross-country comparisons on this matter, some European studies have revealed that after adjusting for sociodemographic variables self-reported health status varied considerably between countries which could be due to cross-cultural differences in reference levels of health, in response style, or the connotation of the questionnaire calling for cautions when making international comparisons (Jurges 2007; Konig et al. 2009). In contrast, one study found no differences between Finnish and Italians in association with self-rated health and mortality (Jylha et al. 1998), and another study showed that individual characteristics such as sociodemographic variables and diseases play the prominent role and not the contextual variables in differences between self-rated health in France and Italy (Desesquelles et al. 2009).

The question is, though, whether different migrant and ethnic groups attach the same meaning to the measure of self-perceived health or have another reference category as the majority population. The international literature seems to disagree on this matter. One study found that poorer self-rated health measured as a single-item measure was associated with greater morbidity within each ethnic group. Furthermore, little evidence was found that the association of self-rated health with more objective measures of morbidity differed between ethnic groups. Thus, the use of a single-item measure of self-rated health to measure health status in different ethnic groups was demonstrated to be valid (Chandola and Jenkinson 2000). Another study showed contrasting results as significant interactions between ethnicity and various states of health were found which implies differences in the meanings attached to the single-item question on self-rated health (Agyemang et al. 2006). Applying these diverging findings to the review suggests that international comparisons should be carried out with precaution. Furthermore, it underlines the use of culturally validated instruments or validated methods to measure self-perceived health among diverse ethnic groups. Still, both subjective health measures and measures that are also more objectively measurable such as number of long-standing illnesses pointed in the same direction (Hjern et al. 2001; Lorant et al. 2008; Stronks et al. 2001) which supports the findings of disadvantaged health for migrants and ethnic minorities.

When looking into the cross-country comparisons, analogous findings across Sweden, The Netherlands and Belgium suggest that equivalent underlying determinants of poor health are at stake, which could be attributable to factors in the country of birth, factors related to the act of migration, and/or to socioeconomic factors and other conditions in the host country. The latter implies that none of the three countries have been able to intervene with the poorer health status among Turkish and Moroccan

migrants. It has been suggested that poor acculturation in the host country could lie behind the increased risk of poor health among certain migrant/ethnic minority groups (Wiking et al. 2004). Only one of the studies in the review looked into these factors and found that the odds of poor self-rated health increased with increasing age at migration to Sweden, and furthermore that those who has resided less than 15 years in Sweden had increased odds in contrary to the migrants who had resided more than 15 years who had similar odds as the majority population (Leao et al. 2009). The same study also explored generational influences and found that although first generation refugees had a poorer self-rated health as compared to the majority population, these differences vanished for the second generation (Leao et al. 2009). These findings were supported (Robertson et al. 2003). For integration policies, prevention efforts, and healthcare planning, these findings are especially interesting, and future studies may possibly include measures of acculturation such as age at migration, length of residence, and fluency in language of host country. For the same reasons, it is important to distinguish between labour workers, refugees, and family reunified persons in future studies as their past and migration history are likely to have a significant influence on their health status.

Enlightenment of migrant and ethnic minority health is essential to initiate preventive and integration efforts but it is challenging because of gaps in the databases, the heterogeneity of migrant populations, and uncertainty about the validity of instruments and language issues. To further understand the association of self-perceived health and migrant status and ethnicity and to facilitate cross-country comparisons, specially designed investigations that are culturally appropriate and translated into the mother tongues of the target group of migrants and ethnic minorities are needed as well as tools and procedures to include migrants and ethnic minorities in general surveys involving the whole population. In this connection, validity of survey instruments is crucial and needs to be investigated. Nevertheless, there is still convincing documentation to act upon the disadvantaged health of migrant/ethnic minority groups. Policies to improve social status, contextual status, and access to healthcare are essential.

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