

RESEARCH REPORT

Ethnicity, acculturation, and self reported health. A population based study among immigrants from Poland, Turkey, and Iran in Sweden

Eivor Wiking, Sven-Erik Johansson, Jan Sundquist

J Epidemiol Community Health 2004;58:574–582. doi: 10.1136/jech.2003.011387

See end of article for authors' affiliations

Correspondence to:
Dr E Wiking, Karolinska
Institutet, Family Medicine
Stockholm, Alfred Nobels
allé 12, SE-141 83
Huddinge, Sweden;
eivorwiking@swipnet.se

Accepted for publication
7 October 2003

Study objective: To analyse the association between ethnicity and poor self reported health and explore the importance of any mediators such as acculturation and discrimination.

Design: A simple random sample of immigrants from Poland (n=840), Turkey (n=840), and Iran (n=480) and of Swedish born persons (n=2250) was used in a cross sectional study in 1996. The risk of poor self reported health was estimated by applying logistic models and stepwise inclusion of the explanatory variables. The response rate was about 68% for the immigrants and 80% for the Swedes. Explanatory variables were: age, ethnicity, educational status, marital status, poor economic resources, knowledge of Swedish, and discrimination.

Main results: Among men from Iran and Turkey there was a threefold increased risk of poor self reported health than Swedes (reference) while the risk was five times higher for women. When socioeconomic status was included in the logistic model the risk decreased slightly. In an explanatory model, Iranian and Turkish women and men had a higher risk of poor health than Polish women and men (reference). The high risks of Turkish born men and women and Iranian born men for poor self reported health decreased to non-significance after the inclusion of SES and low knowledge of Swedish. The high risks of Iranian born women for poor self reported health decreased to non-significance after the inclusion of low SES, low knowledge of Swedish, and discrimination.

Conclusions: The strong association between ethnicity and poor self reported health seems to be mediated by socioeconomic status, poor acculturation, and discrimination.

Ethnicity is associated with long term illness and poor health and of equal importance to socioeconomic status (SES).¹ Belonging to a group of people with a specific history in a foreign country with a common language, or having the same religion constitutes ethnic identity for individuals.² Immigrants, regardless of whether they are labour migrants or refugees, have to acculturate into a different society and culture—a difficult task for people who have been forced to leave their countries.

Self reported health is an indicator for morbidity in the population and may be used in primary health care to detect poor health in immigrants. Less studied immigrants such as Turks and Iranians, make up 8% and 12% respectively of the foreign born non-European population in Sweden, have increased risk of coronary heart disease³ and psychiatric disease.⁴ In Amsterdam, immigrants from Turkey, Morocco, and former Dutch colonies had increased risks of poor self reported health compared with the majority population.⁵ Moreover, poor influence of cultural factors and poor living conditions seemed to contribute to the poor health status of immigrants, especially from Turkey and Morocco, as well as low SES. This is especially important because ethnic differences in health have often been claimed without accounting for SES and cultural differences.^{6,7} Moreover, in the United States, ethnic differences in health have often been presented without taken SES into account.⁶

In this paper we will study self reported health in Turkish immigrants, often poorly educated (especially women) and immigrants from Iran, often well educated. The conditions for immigrants from Poland are more similar to those of Swedes and can therefore be useful as a control group. Furthermore, the study explores eventually mediators between ethnicity and poor self reported health—that is,

whether the relation between ethnicity and self reported health remains after the importance of acculturation and discrimination in Turks and Iranians is taken into consideration, with Polish women and men as controls. Acculturation is defined as the culture change (knowledge of Swedish) that results from continuous contact between two distinct cultural groups.

The first aim of this study is to analyse whether ethnicity (Turkish, Iranian, Polish ethnicity, and Swedish controls) is associated with self reported health.

The second aim is to analyse whether the hypothesised relation between ethnicity and self reported health may be explained by SES with Swedish born people as reference group.

The third aim is to analyse if the hypothesised relation between ethnicity and self reported health may be mediated by SES and cultural factors such as poor acculturation and discrimination with Poles as the reference group.

METHODS

Study population

A simple random national sample of Swedish born persons (n=2250), immigrants born in Poland (n=840), Turkey (n=840), and Iran (n=480), aged between 27 and 60, was drawn from the Swedish population register in a survey made by Statistics Sweden in 1996. The immigrants from Poland and Turkey were aged 20 to 44 at the time of their arrival in Sweden between 1980 and 1989 and between 27 and 60 when interviewed. The Iranians arrived in Sweden between 1985 and 1989 and were interviewed at ages 27 to 55. The Swedes were used as a control group and were all aged 27–60 when interviewed. A standardised translated and culturally adapted questionnaire was used in

Table 1A Distribution of the explanatory variables by ethnicity (men, n = 2150)

Variable (n)	Sweden (1107)	Poland (267)	Turkey (464)	Iran (312)	Total (2150)
Age					
27–39	40.5	29.5	59.6	69.0	44.8
40–49	29.9	54.5	33.7	26.9	32.0
50–60	29.6	16.0	6.7	4.1	23.2
Education					
Low	20.6	4.9	50.5	6.6	22.0
Medium	51.4	44.2	27.4	43.7	47.0
High	28.0	50.9	22.1	49.7	31.0
Marital status					
Single	25.3	25.2	11.9	35.5	24.4
Married/cohabiting	74.7	74.8	88.1	64.5	75.6
Poor economic resources					
Yes	15.6	25.8	42.5	49.2	23.0
No	84.4	74.2	57.5	50.8	77.0
Knowledge of Swedish					
Low	–	6.1	20.4	4.0	11.8
Medium	–	13.5	29.8	23.9	23.9
High	–	80.4	49.8	72.1	64.3
Discrimination					
High	–	33.7	34.0	64.0	43.1
Medium	–	22.1	33.0	23.4	27.3
None	–	44.2	33.0	12.6	29.6

face to face interviews to collect data about socioeconomic factors.

The response rate was about 68% for the immigrants, 69.6% for Poles, 65.6% for Turks, and 68.1% for Iranians and 80% for the Swedes in the control group. About half of all non-respondents refused to participate and the other half could not be located. A possible reason for the high proportion of missing persons might be that many of the immigrants had been repatriated but had not informed the Swedish authorities (that is, the population registry) of their departure. The age distribution among respondents and non-respondents was about the same. People in younger age brackets from Turkey and Iran answered the questionnaire to a higher extent than people from Sweden and Poland of corresponding age (data not shown). Among Iranians and Poles, men were overrepresented compared with women (60:40) among the non-respondents, but not so for the Turks. In big cities non-respondents were overrepresented compared with respondents, for Iranians 70%

compared with 56%, for Poles 82% compared with 63%, and for Turks 81% compared with 62%. Among Iranian non-respondents 21% had no income, compared with 7% for respondents. For Polish non-respondents 11% had no income, compared with 4% for respondents. The figures for the Turks were 19% for non-respondents and 11% for respondents.

Explanatory variables

Age

Age was classified in the following groups: 27–39, 40–49, and 50–60 years of age.

Ethnicity

The sample consisted of two groups born in non-Westernised countries (Turkey, Iran) and two European reference groups (Poland, Sweden). For Iranians, reasons for immigration were political, religious, or war related. For Polish immigrants family related reasons were more common than political.

Table 1B Distribution of the explanatory variables by ethnicity (women, n = 2260)

Variable (n)	Sweden (1143)	Poland (573)	Turkey (376)	Iran (168)	Total (2260)
Age					
27–39	40.0	41.0	59.3	61.9	43.4
40–49	30.4	48.6	31.2	32.2	33.8
50–60	29.6	10.4	9.5	5.9	22.8
Education					
Low	16.5	5.4	70.5	13.6	20.1
Medium	51.5	47.9	21.2	50.8	47.6
High	32.0	46.7	8.3	35.6	32.3
Marital status					
Single	21.4	29.6	23.3	28.8	23.5
Married/cohabiting	78.6	70.4	76.7	71.2	76.5
Poor economic resources					
Yes	18.2	25.2	50.2	53.4	24.7
No	81.8	74.8	49.8	46.6	75.3
Knowledge of Swedish					
Low	–	4.0	44.4	10.2	17.6
Medium	–	14.5	26.1	30.5	20.7
High	–	81.5	29.5	59.3	61.7
Discrimination					
High	–	53.6	44.8	22.0	28.4
Medium	–	25.2	28.2	22.0	25.7
None	–	21.2	27.0	56.0	45.9

Table 2A Prevalence in percentage of poor self reported health status by ethnicity (men)

Variable	Sweden	Poland	Turkey	Iran
Age				
27–39	9.4	16.7	25.9	27.9
40–49	14.0	19.1	35.4	34.0
50–60	23.8	34.6	52.6	37.5
Education				
Low	21.0	62.5	34.0	46.2
Medium	15.3	20.8	29.5	33.7
High	10.0	16.9	25.4	24.5
Marital status				
Single	17.6	31.7	32.4	32.9
Married/cohabiting	14.1	17.2	30.7	28.4
Poor economic resources				
Yes	25.1	40.5	38.8	38.1
No	13.2	14.1	25.0	22.0
Knowledge of Swedish				
Low	–	50.0	41.4	75.0
Medium	–	27.3	30.6	46.8
High	–	17.6	26.8	21.8
Discrimination				
High	–	36.4	39.2	34.1
Medium	–	16.7	29.8	23.9
None	–	11.1	23.4	20.0

Educational status

Educational status was divided into three categories indicating the extent of school attendance: low: less than 10 years; medium: between 10 and 12 years; and high: more than 12 years of school.

Marital status

Marital status is dichotomised according to whether the respondent was single or married/cohabiting.

Poor economic resources

Each respondent was asked: “If you were in economic difficulties, could you raise \$1750 (= SEK14 000) within a week?” Answers were dichotomised as “yes” or “no”.

Knowledge of Swedish

The immigrants had to answer five questions about: (1) ability to understand news reports on radio and television, (2) speaking in Swedish at meetings, (3) communicating

with authorities over the telephone (for instance calling the health department, social security office, or unemployment centre), (4) reading books in Swedish, and (5) completing a written application for employment. The immigrants were divided into three groups: low, medium, and high according to the answers to these questions. The questions had four possible alternatives, with 1 characterising the highest degree and 4 the lowest degree of knowledge of Swedish. The answers given by the participants were dichotomised with 1 including alternatives 1 and 2. The dichotomy variables were summed and categorised in three levels, with the low level of knowledge of Swedish including the sums lower than 3, the medium level sums 3 and 4, and the high level the sum 5.

Discrimination

The immigrants had to answer questions about discrimination at work or at the employment agency, by the housing

Table 2B Prevalence in percentage of poor self reported health status by ethnicity (women)

Variable	Sweden	Poland	Turkey	Iran
Age				
27–39	12.9	21.7	43.4	41.1
40–49	18.9	29.4	53.3	55.3
50–60	30.9	45.2	65.2	85.7
Education				
Low	32.1	45.5	52.9	56.3
Medium	19.9	30.4	35.3	46.7
High	14.2	23.3	45.0	47.6
Marital status				
Single	27.5	32.5	53.6	55.9
Married/cohabiting	18.0	26.0	47.0	45.2
Poor economic resources				
Yes	28.3	38.2	58.7	50.8
No	18.2	24.4	38.3	45.5
Knowledge of Swedish				
Low	–	62.5	59.8	75.0
Medium	–	42.4	46.0	63.9
High	–	23.6	33.8	35.7
Discrimination				
High	–	36.1	63.1	51.5
Medium	–	32.4	42.7	42.3
None	–	22.6	43.5	46.2

Table 3A The risk (odds ratios with 95% confidence intervals) of poor self reported health status by step wise inclusion of the explanatory variables by logistic regression in men (n = 2150) (Sweden reference group)

Variable	Level	Model			
		Age+ethnicity	+Education	+Poor economic resources	+Marital status
Ethnicity	Sweden	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Poland	1.62 (1.35 to 1.95)	1.88 (1.28 to 2.77)	1.72 (1.16 to 2.54)	1.72 (1.10 to 2.69)
	Turkey	3.36 (2.93 to 3.85)	3.07 (2.28 to 4.13)	2.46 (1.81 to 3.33)	2.61 (1.84 to 3.72)
	Iran	3.41 (2.91 to 3.99)	3.94 (2.81 to 5.52)	2.95 (2.09 to 4.17)	2.92 (1.96 to 4.35)
Education	Low	1.99 (1.48 to 2.69)	1.92 (1.42 to 2.59)	1.92 (1.42 to 2.59)	1.91 (1.36 to 2.70)
	Medium	1.58 (1.22 to 2.05)	1.49 (1.15 to 1.94)	1.49 (1.15 to 1.94)	1.49 (1.10 to 2.00)
	High	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Poor economic resources	Yes		2.54 (2.01 to 3.20)	2.54 (2.01 to 3.20)	2.46 (1.88 to 3.22)
	No		1 (ref)	1 (ref)	1 (ref)
Marital status	Single				1.35 (1.03 to 1.78)
	Married/cohabiting				1 (ref)
Model improvement	-2×log likelihood		19.1	49.7	4.9
	Degrees of freedom		2	1	1
	p value		<0.0001	<0.0001	0.0027

agency or landlord or by neighbours, at the bank, in the health service, insurance agency, social service, the police office, and at restaurants. The questions had six different alternatives on a ranging scale from 1 to 5, where 1 was the least discrimination and 5 the greatest; the final alternative was "not relevant". Each of these 15 questions was dichotomised, with 1 indicating that the person was discriminated (alternatives 4 and 5). The dichotomy variables were summed up and categorised into three levels. The level low consisted of the sum equal to zero, the medium consisted of sums one and two, and the high level of discrimination included sums higher than two.

Outcome variable

Information on the dependent variable self reported health was elicited by asking respondents the question: "How is your general condition?" The answer alternatives were: 1 very good, 2 good, 3 tolerable, 4 poor, 5 very poor. The answers given by the respondents were categorised in two groups: very good, good, and tolerable compared with poor and very poor.

Statistical analysis

The prevalence of poor self reported health by ethnicity has been estimated for men and women (see tables 1 and 2). The data were analysed by applying a logistic regression model.⁸ The results are presented as odds ratios (OR) with a 95% confidence interval (CI). If the deviance was of about the same size as the degrees of freedom, the fit of the model

was considered satisfactory. An age adjusted logistic model (table 3) and then successive main effect models (table 4) were considered. Explanatory variables were included one by one into the main effect models in two separate analyses, one for men (table 3A and 4A) and one for women (table 3B and 4B) for calculating the risk of poor self reported health. All included variables except marital status in tables 4A and B improved the previous model. Model improvement was measured as the difference in $-2 \times \log$ likelihood and degrees of freedom between the smaller model and the extended model.

RESULTS

About half of the men from Iran and Poland had a high level of education. In contrast, about a quarter of the Swedish born men had attained a high level of education. About 70% of women from Turkey had a low educational status (tables 1A and 1B). The frequency of marriage or cohabiting was high in Turkish men and low in Iranian men. Being able to raise \$1750 within a week (variable "poor economic resources") was possible for half of the Iranians and Turks. In contrast, about 75% of the Polish immigrants had good economic resources.

Only every third Turkish born woman had a good knowledge of Swedish. Men from Iran and Poland, women from Poland seemed to be most acculturated into Swedish culture, as about 72%, 80%, and 82%, respectively, had a high level of knowledge of Swedish.

Table 3B The risk (odds ratios with 95% confidence intervals) of poor self reported health status by step wise inclusion of the explanatory variables by logistic regression in women (n = 2260) (Sweden reference group)

Variable	Level	Model			
		Age+ethnicity	+Education	+Poor economic resources	+Marital status
Ethnicity	Sweden	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Poland	1.83 (1.61 to 2.07)	2.03 (1.63 to 2.52)	1.94 (1.51 to 2.51)	1.90 (1.42 to 2.53)
	Turkey	5.00 (4.33 to 5.76)	3.69 (2.82 to 4.84)	3.09 (2.24 to 4.26)	3.13 (2.18 to 4.51)
	Iran	5.12 (4.24 to 6.19)	5.28 (3.81 to 7.32)	4.24 (2.88 to 6.26)	4.25 (2.74 to 6.60)
Education	Low	2.17 (1.70 to 2.78)	2.17 (1.70 to 2.78)	2.08 (1.56 to 2.78)	2.11 (1.53 to 2.93)
	Medium	1.46 (1.20 to 1.78)	1.42 (1.13 to 1.79)	1.42 (1.13 to 1.79)	1.44 (1.11 to 1.86)
	High	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Poor economic resources	Yes		2.16 (1.74 to 2.68)	2.16 (1.74 to 2.68)	2.02 (1.57 to 2.59)
	No		1 (ref)	1 (ref)	1 (ref)
Marital status	Single				1.41 (1.11 to 1.81)
	Married/cohabiting				1 (ref)
Model improvement	-2×log likelihood		25.9	41.9	8.5
	Degrees of freedom		2	1	1
	p value		<0.0001	0.0001	0.004

Table 4A The risk (odds ratios with 95% confidence intervals) of poor self reported health status by stepwise inclusion of the explanatory variables by logistic regression in men (n = 645) (Poland reference group)

Variable	Level	Model					
		Age+ethnicity	+Education	+Poor economic resources	+Marital status	+Knowledge of Swedish	+Discrimination
Ethnicity	Poland	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Turkey	2.03 (1.61 to 2.57)	1.60 (0.96 to 2.67)	1.40 (0.85 to 2.33)	1.47 (0.79 to 2.72)	1.31 (0.71 to 2.41)	1.29 (0.69 to 2.44)
	Iran	2.05 (1.59 to 2.64)	2.11 (1.28 to 3.50)	1.74 (1.06 to 2.89)	1.72 (0.93 to 3.16)	1.61 (0.88 to 2.93)	1.31 (0.70 to 2.46)
Education	Low		2.14 (1.30 to 3.52)	2.10 (1.28 to 3.44)	2.11 (1.17 to 3.84)	1.60 (0.86 to 2.97)	1.77 (0.93 to 3.36)
	Medium		1.63 (1.07 to 2.47)	1.59 (1.05 to 2.41)	1.58 (0.96 to 2.60)	1.46 (0.89 to 2.39)	1.52 (0.92 to 2.53)
	High		1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Poor economic resources	Yes			2.37 (1.69 to 3.35)	2.32 (1.53 to 3.52)	2.29 (1.52 to 3.45)	1.98 (1.29 to 3.04)
	No			1 (ref)	1 (ref)	1 (ref)	1 (ref)
Marital status	Single				1.31 (0.80 to 2.15)	1.34 (0.82 to 2.18)	1.27 (0.77 to 2.09)
	Married/cohabiting				1 (ref)	1 (ref)	1 (ref)
Knowledge of Swedish	Low					2.32 (1.21 to 4.43)	2.34 (1.20 to 4.57)
	Medium					1.63 (1.00 to 2.64)	1.61 (0.98 to 2.65)
	High					1 (ref)	1 (ref)
Discrimination	High						2.54 (1.45 to 4.45)
	Medium						1.49 (0.80 to 2.68)
	None						1 (ref)
Model improvement	-2x log likelihood		19.5	22.0	1.5	9.6	15.0
	Degrees of freedom		2	1	1	2	2
	p value		<0.0001	<0.0001	0.22	0.008	0.0006

Table 4B The risk (odds ratios with 95% confidence intervals) of poor self reported health status by stepwise inclusion of the explanatory variables by logistic regression in women (n = 764) (Poland reference group)

Variable	Level	Model					
		Age-ethnicity	+Education	+Poor economic resources	+Marital status	+Knowledge of Swedish	+Discrimination
Ethnicity	Poland	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Turkey	2.73 (2.23 to 3.33)	1.89 (1.28 to 2.77)	1.70 (1.08 to 2.67)	1.72 (1.04 to 2.84)	1.32 (0.76 to 2.28)	1.25 (0.72 to 2.17)
Education	Iran	2.80 (2.17 to 3.60)	2.64 (1.83 to 3.80)	2.25 (1.46 to 3.47)	2.28 (1.40 to 3.69)	1.95 (1.17 to 3.25)	1.59 (0.94 to 2.68)
	Low		1.99 (1.30 to 3.03)	1.82 (1.11 to 3.00)	1.86 (1.07 to 3.24)	1.12 (0.60 to 2.11)	1.23 (0.65 to 2.32)
Poor economic resources	Medium		1.34 (0.98 to 1.83)	1.26 (0.87 to 1.82)	1.26 (0.84 to 1.90)	1.08 (0.70 to 1.66)	1.13 (0.73 to 1.75)
	High		1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Marital status	Yes			1.94 (1.41 to 2.65)	1.88 (1.32 to 2.67)	1.85 (1.28 to 2.67)	1.75 (1.20 to 2.53)
	No			1 (ref)	1 (ref)	1 (ref)	1 (ref)
Knowledge of Swedish	Single				1.25 (0.86 to 1.82)	1.27 (0.86 to 1.87)	1.23 (0.83 to 1.83)
	Married/cohabiting				1 (ref)	1 (ref)	1 (ref)
Discrimination	Low					3.06 (1.70 to 5.50)	3.05 (1.69 to 5.49)
	Medium					2.09 (1.33 to 3.30)	1.28 (0.82 to 1.99)
Model improvement	High					1 (ref)	1 (ref)
	High						2.04 (1.33 to 3.14)
Degrees of freedom	Medium						2.28 (0.82 to 1.99)
	None						1 (ref)
p value	-2*log likelihood		7.2	15.9	1.6	20.9	12.9
	Degrees of freedom		2	1	1	2	2
			0.027	<0.0001	0.21	<0.0001	0.0016

Key points

- Ethnicity is associated with poor self reported health.
- Socioeconomic conditions explained only a part of the association between ethnicity and poor health.
- Acculturation is also an important factor related to poor self reported health.
- Acculturation and discrimination are two important mediators in the pathway between ethnicity and poor health.
- Acculturation explained the large differences in risks of poor self reported health between the SES groups for both men and women.

Feeling discriminated was most common in the group of Iranian men. In contrast, more than half of Iranian women did not feel any discrimination at all. Discrimination was also common among Turkish women. There were interesting differences in the Polish group between knowledge of Swedish and discrimination.

About 80% of men and women from Poland had a good knowledge of Swedish, but more than half of the women had a high discrimination level compared with men, of whom only around a third had a high discrimination level.

Tables 2A and 2B illustrate that 43% of women from Turkey in the age group 27–39 reported poor health and 41% of women from Iran. In contrast, only 22% of Polish women and 13% of Swedish women reported poor health. Less than one third of men in the same age group from Iran and Turkey have poor self reported health. More than half of the female participants from Turkey and Iran with low educational status, poor economic resources, low knowledge of Swedish, and a high degree of discrimination have reported poor health.

Tables 3A and B show the risk of poor self reported health after step wise inclusion of the explanatory variables in men and women, respectively. Sweden is the reference group. The threefold increased risk of poor self reported health for men born in Iran and Turkey than Swedish born men decreased slightly especially for men born in Turkey after the inclusion of poor economic resources into the model. The fivefold increased risk of poor self reported health decreased with 130% for Turkish born women after inclusion of educational status, and further 60% after the inclusion of poor economic resources. For Iranian born women the risk decreased after the inclusion of poor economic resources.

Table 4 illustrates the risk of poor self reported health after stepwise inclusion of the explanatory variables by sex compared with Poland as reference group. The high risks of Turkish born and Iranian born men decreased after the inclusion of SES and further after the inclusion of low knowledge of Swedish. For women born in Turkey the high risks (OR = 2.73) of poor self reported health decreased after the stepwise inclusion of education (OR = 1.89), poor economic resources (OR = 1.70), and to non-significance (OR = 1.32) after inclusion of low knowledge of Swedish. Thus, low SES and poor acculturation explained the high risks of poor self reported health among Turkish born women. Among Iranian born women low SES, poor acculturation, and discrimination explained the high risks of poor self reported health (table 4B). Interestingly, when including knowledge of Swedish the large differences in risks of poor self reported health between the SES groups decreased to non-significance for both men and women.

Policy implications

- This study emphasises the importance of providing language teaching for immigrants by the host countries. The education should be tailored for both low and high educated immigrants and start as soon as possible after the person has sought asylum or residence permit.
- Immigrants also need a swift introduction to the new labour market. Therefore, asylum seekers should have at least one period as a trainee after acquisition of sufficient language skills. The practice would also facilitate their linguistic development and cultural understanding of the host country. Financial incentives to employ immigrants could be used.
- Access to primary health care must be increased in areas where the proportion of immigrants is high. The consulting time when visiting a doctor must be prolonged for immigrant patients. The primary health-care staff need more education about the migratory process, different cultures, and the risks of poor health for immigrants.
- Finally, a need for health education and health promotion in general, targeted at specific deprived and immigrant groups must be performed.

DISCUSSION

The main finding of this cross sectional study is that ethnicity is associated with poor self reported health. Our hypothesis that the relation between ethnicity and poor self reported health could be fully explained by low SES was not confirmed. Socioeconomic conditions explained only a part of the association between ethnicity and poor health. Our third hypothesis proved to be right. Poor acculturation and discrimination explained the association between ethnicity and poor self reported health. Thus, acculturation and discrimination are two important mediators in the pathway between ethnicity and poor health besides low SES. Another interesting finding was that the large differences in risks of poor self reported health between the SES groups could be explained by poor acculturation.

The finding that ethnicity is related to poor self reported health agreed with studies from Sweden,¹ Netherlands,⁵ Israel,¹⁰ and the United States.¹¹

The finding that SES explained only a part of the association between ethnicity and poor self reported health agreed with a Swedish⁹ and Dutch study.⁵ In the Swedish study a substantial reduction of the risk of poor self reported health was observed for men and women born in Yugoslavia, Arabic speaking countries, and all other countries, and for women born in Poland after adjustment for SES.⁹ Particularly, immigrants from Turkey and Morocco with high risks of self reported poor health decreased with more than 100% after the inclusion of education, income, and occupational status. However, the risks remained high, comparable with this study.⁵

Although acculturation is more complex than knowledge of language, it has been shown to be related to health status and use of healthcare services.¹² The increased risk of poor self reported health for Turkish born men and women and Iranian born men was explained by low SES and low knowledge of Swedish while the high risks of Iranian born women for poor self reported health was explained by low SES, low knowledge of Swedish, and discrimination. Therefore it is possible to claim that acculturation and

discrimination were in the pathway between ethnicity and poor health.

We can only speculate why so large a proportion of Iranian men felt discriminated although they had high knowledge of Swedish. Most Iranian men are highly educated but they have problems to get a job in level with their education. Polish women have probably the same background although they have good knowledge of Swedish. The explanation that so many Turkish women felt discriminated is the low level of Swedish knowledge.

Genetic and biological factors have probably a limited contribution to poor health among Turks and Iranians in this study. Turks and Iranians are mainly white like the majority population in Sweden. Moreover, people, who emigrate from their country of birth to another country, or even another part of the world, are generally healthier than those who do not emigrate from their native country. This is a kind of health selection. However, this "healthy migrant effect" tends to wear off with time.¹³ In this study, we were able to show that low SES and cultural factors such as poor acculturation and discrimination could explain poor self reported health among Turks and Iranians.

Limitations and strengths

A limitation of this study was that the health status is self reported instead of diagnosed diseases. However, self reported health is widely used in European studies¹⁴⁻¹⁷ and in American studies.¹⁸⁻¹⁹ Self reported health is an important independent predictor of all cause mortality.²⁰⁻²¹ Cultural differences between ethnic groups may imply that they perceive their combined physical and psychological health differently.²² It is a subjective measure of health and could reflect a person's general perception of quality of life. Self reported health also varies with age, sex, and social context.²³ However, it has been found that there is a strong association between self reported health in different ethnic groups in the USA and the total mortality of these ethnic groups.²⁴ This association seems to be universal rather than culturally determined.⁹

Another limitation of this study was that basic education is differently defined in different countries and different ages. Nevertheless education was a strong risk factor for poor self reported health in both Turks and Iranian men and women. Finally, acculturation and discrimination are associated with drug and alcohol dependency, social support networks, legal and political issues, quality of local health services, income and lifestyle, working conditions and environments, family functions and support, intergenerational conflicts, ethnic supports and coping, continued residence, value history of life, self esteem, religious affliction, and life satisfaction. These variables were not possible to explore in this limited study.

As the study was cross sectional, the causality must be handled with caution.

The non-response rate was higher in the immigrant group than among the Swedish control group. This means that it could be difficult to draw conclusions due to ethnicity. We do not know whether the non-respondents would have reported better or worse health if they had answered the questions. As the non-response rate is higher in younger age brackets from Turkey and Iran, it must be remembered that the risk of poor self reported health is probably lower because morbidity and mortality are lower in that group.

There are some strengths to this study. For example, the same questions have been used for a long time by Statistics Sweden in their annual survey of living conditions. The validity, consistent over time, and reliability have been found to be high.²⁵ Another strength is that the sample is representative of Turks, Iranians, and Poles in Sweden.

This study showed that low SES, poor acculturation, and discrimination were mediators between ethnicity and poor self reported health because they explained the relation between these factors.

PUBLIC HEALTH IMPLICATIONS

It is important to give immigrants opportunities to acquire a better knowledge of the main language in the immigration country. It gives knowledge about the culture, facilitates communication with different authorities, to obtain an employment, and it prevents discrimination. Discrimination must also be hindered by legislation and integration into society promoted. Foreign qualifications must be evaluated higher to prevent well educated persons from discrimination in the labour market. Access to primary health care must be increased in areas where the proportion of immigrants is high. The consulting time when visiting a doctor must be prolonged for immigrant patients and an interpreter always called in when needed. The primary healthcare staff needs more education about the migratory process, different cultures, and the risks of poor health for immigrants. Further investigations about acculturation and migration related factors associated with health over time are also important. Finally, a need for health education and health promotion in general, targeted at specific deprived and immigrant groups must be performed.

ACKNOWLEDGEMENTS

We are grateful for statistical assistance from Helena Ahlén.

Authors' affiliations

E Wiking, S E Johansson, J Sundquist, Family Medicine Stockholm, Karolinska Institutet, Sweden

Funding: This work was supported by the National Institutes of Health, grant no 1 R01-HL71084-01, the Knut and Alice Wallenberg Foundation grant no 99.046, the Swedish Council for Working Life and Social Research, grant no 2001-2373, and the Swedish Research Council grant no K2001-27X-11651-06C.

Conflicts of interest: none declared.

REFERENCES

- 1 Sundquist J. Ethnicity, social class and health. A population-based study on the influence of social factors on self-reported illness in 223 Latin American refugees, 33 Finnish and 126 South European labour migrants and 841 Swedish controls. *Soc Sci Med* 1995;**40**:777-87.
- 2 Weber M. Ekonomi och samhälle I. Förståendesociologins grunder. *Sociologiska begrepp och definitioner* (Wirtschaft und Gesellschaft. Grundriß der verstehenden Soziologie). [In Swedish]. Lund: Argos förlag, 1983.
- 3 Gadd M, Johansson S-E, Sundquist J, et al. Morbidity in cardiovascular diseases in immigrants in Sweden. *J Intern Med* 2003;**254**:236-43.
- 4 Westman J, Hasselström J, Johansson S-E, et al. The influences of place of birth and socioeconomic factors on attempted suicide in a defined population of 4.5 million people. *Arch Gen Psychiatry* 2003;**60**:409-14.
- 5 Reijneveld SA. Reported health, lifestyles, and use of health care of first generation immigrants in the Netherlands: do socioeconomic factors explain their adverse position? *J Epidemiol Community Health* 1998;**52**:298-304.
- 6 Lillie-Blanton M, LaVeist T. Race/ethnicity, the social environment, and health. *Soc Sci Med* 1996;**43**:83-91.
- 7 Muntaner C, Nieto FJ, O'Campo P. The Bell curve: on race, social class, and epidemiologic research. *Am J Epidemiol* 1996;**144**:531-6.
- 8 Hosmer DV, Lemeshow S. *Applied logistic regression*. 2nd edn. New York: Wiley, 2000.
- 9 Lindström M, Sundquist J, Östergren P-O. Ethnic differences in self-reported health in Malmö in southern Sweden. *J Epidemiol Community Health* 2001;**55**:97-103.
- 10 Baron-Epel O, Kaplan G. Self-reported health status of immigrants from the former Soviet Union in Israel. *Isr Med Assoc J* 2001;**3**:940-6.
- 11 Ren XS, Amick BC III. Race and self assessed health status: the role of socioeconomic factors in the USA. *J Epidemiol Community Health* 1996;**50**:269-73.
- 12 Sundquist J, Winkleby A. Cardiovascular risk factors in Mexican American adults: a transcultural analysis of NHANES III, 1988-1994. *Am J Public Health* 1999;**89**:723-30.
- 13 Williams R. Health and length of residence among South Asians in Glasgow: a study controlling for age. *J Public Health Med* 1993;**15**:52-60.
- 14 Heistaro S, Vartiainen E, Puska P. Trends in self-rated health in Finland 1972-1992. *Prev Med* 1996;**25**:625-32.

- 15 **Power C**, Matthews S, Manor O. Inequalities in self-rated health: explanations from different stages of life. *Lancet* 1998;**351**:1009–14.
- 16 **Krause NM**, Jay GM. What do global self-rated health items measure? *Med Care* 1994;**32**:930–42.
- 17 **Fernandez de la Hoz K**, Leon DA. Self-perceived health status and inequalities in use of health services in Spain. *Int J Epidemiol* 1996;**25**:593–603.
- 18 **Kaplan GA**, Camacho T. Perceived health and mortality: a nine-year follow-up of the Human Population Laboratory cohort. *Am J Epidemiol* 1983;**117**:292–304.
- 19 **Grant MD**, Piotrowski ZH, Chappell R. Self-reported health status and survival in the longitudinal study of aging, 1984–1986. *J Clin Epidemiol* 1995;**48**:375–87.
- 20 **Miilunpalo S**, Vuori I, Oja P, *et al.* Self-rated health status as a health measure: the predictive value of self-reported health status on the use of physician services and on mortality in the working-age population. *J Clin Epidemiol* 1997;**50**:517–28.
- 21 **Kington R**, Lillard L, Rogowski J. Reproductive history, socioeconomic status, and self-reported health status of women aged 50 years and older. *Am J Public Health* 1997;**87**:33–7.
- 22 **Shetterly SM**, Baxter J, Mason LD, *et al.* Self-rated health among Hispanic vs non-Hispanic white adults: the San Luis Valley Health and Aging Study. *Am J Public Health* 1996;**86**:1798–801.
- 23 **McCallum J**, Shadbolt B, Wang D. Self-rated health and survival: a 7-year follow-up study of Australian elderly. *Am J Public Health* 1994;**84**:1100–5.
- 24 **McGee DL**, Liao Y, Cao G, *et al.* Self-reported health status and mortality in a multiethnic US cohort. *Am J Epidemiol* 1999;**149**:41–6.
- 25 **Wärneryd B**. *Levnadsförhållanden. Återintervjustudie i undersökningen av levnadsförhållanden (ULF) 1989. (Living conditions. Reinterview in ULF 1989.) [In Swedish]*. Stockholm: Statistics Sweden, 1991, appendix 12.

ECHO

Randomisation in trials: do potential trial participants understand it and find it acceptable?

C Kerr, E Robinson, A Stevens, D Braunholtz, S Edwards, R Lilford



Please visit the *Journal of Epidemiology and Community Health* website [www.jech.com] for a link to the full text of this article.

Objective: To examine lay persons' ability to identify methods of random allocation and their acceptability of using methods of random allocation in a clinical trial context.

Design: Leaflets containing hypothetical medical, non-medical, and clinical trial scenarios involving random allocation, using material from guidelines for trial information leaflets.

Setting and participants: Adults attending further education colleges (n = 130), covering a wide range of ages, occupations, and levels of education.

Main measures: Judgements of whether each of five methods of allocation to two groups was random in a medical or non-medical scenario. Judgements of whether these allocation methods were acceptable in a randomised clinical trial scenario, with or without a scientific justification for randomisation.

Results: The majority of our group of participants judged correctly that allowing people their preference was not random, and that the following were random: using a computer with no information about the individual (recommended wording for MREC trial leaflets), tossing a coin, drawing a name out of a hat. Judgements were split over allocating people in turn (not a random allocation method but shares features with randomisation). Judgements were no different in medical and non-medical scenarios. Few of the correctly identified random methods were judged to be acceptable in a clinical trial scenario. Inclusion of a scientific justification for randomising significantly increased the acceptability of only one random method: allocation by computer.

Conclusions: Current UK guidelines' recommended description of random allocation by computer seems warranted. However, while potential trial participants may understand what random allocation means, they may find it unacceptable unless offered an acceptable justification for its use.

▲ *Journal of Medical Ethics* 2004;**30**:80–84.