# Reported health, lifestyles, and use of health care of first generation immigrants in the Netherlands: do socioeconomic factors explain their adverse position?

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## Abstract

*Objective*—Differences in health, lifestyles, and use of health care between groups of varying ethnic origin can have important implications for preventive and curative health care. This paper studies whether socioeconomic factors explain ethnic differences in these outcomes.

*Design*—Data on health status, lifestyles, and use of health care were obtained from interviews with 3296 people aged 16–64 years (response: 60.6%), among whom were 848 first generation immigrants. Ethnic differences in these outcomes were examined with and without adjustment for socioeconomic factors, using logistic regression.

*Setting*—General population of Amsterdam, the Netherlands.

*Main outcome measures*—Health status (self rated health, General Health Questionnaire, functional limitations), lifestyles (smoking, alcohol), and use of health care (general practice, pharmaceuticals, hospitalisations).

*Main results*—Immigrants from Turkey, Morocco and (former) Dutch colonies report a poorer health and a higher use of health care, especially primary health care among the elderly. An adverse socioeconomic position partially explains the poor health of these immigrants. In turn, their poor health explains most of their higher use of health care.

*Conclusions*—Cultural factors and poor living conditions seem to contribute to the poor health of immigrants, besides an adverse socioeconomic position. The pressure on various health services will increase in future because of the relatively high increase in immigrants' needs at older ages and their presently low mean age.

(*J Epidemiol Community Health* 1998;**52**:298–304)

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Differences in health status, lifestyles, and use of health care between groups of varying ethnic origin can have important implications for preventive and curative health care.[1–4] For a proper targeting of this care, information is needed on the health status of separate ethnic groups and on the mechanisms that lead to a poorer health for them, if any. Such a poorer health may firstly result from an adverse social and economic position of immigrant and ethnic minority groups. Other explanations are poor living conditions, including discrimination, cultural factors like a different perception of health, and biological factors, especially a poorer health status at the moment of migration and racial differences. Especially racial differences are often chosen as an explanation for ethnic health differences without a proper accounting for socioeconomic (SE) and cultural differences.[3 5]

In the Netherlands, the number of immigrants is growing and many of them have a poor health. In 1995, first generation immigrants—that is, foreign born Dutch residents—comprised 8.9% of the Dutch population. In the Dutch big cities their population share is much larger: in Amsterdam, the Dutch capital, it was 26.7% in 1995. Main groups that are a target for public policies are people born in (former) Dutch colonies, like Surinam and the Netherlands Antilles, and people born in some Mediterranean countries from which labourers were recruited in the past, especially Turkey and Morocco. The health status of these immigrant groups seems to be worse than that of the indigenous population.[4 6] Weide and Foets reviewed all studies published during the past 10 years on their reported health status and use of health care.[6] Their review shows that the prevalence of a poor self rated health and of health complaints is higher among Turks, Moroccans, and Surinameses. The same holds for the reported use of prescribed pharmaceuticals and of general practitioner (GP) care. However, none of the reviewed studies provides summary information on all relevant groups.

This paper studies the reported health, lifestyles, and use of health care of all aforementioned groups, defined on the basis of their registered country of birth. It examines whether an adverse health status of first generation immigrants can be explained by their SE position. With regard to the ethnic differences in the use of health care, it also assesses the relative importance of SE position, health status, and insurance status in the explanation of these differences.

## Methods

Data on health status, lifestyles, use of health care, SE position and social background of residents aged 16–64 years came from a community survey among the Amsterdam population.

*Table 1  Response rates among residents aged 16–64 years by ethnic group as registered in the Amsterdam municipal population register*

| Country of birth | Response rate (%) | Number of respondents |
|---|---|---|
| Netherlands | 61.7 | 2448 |
| Surinam | 55.7 | 185 |
| Netherlands Antilles | 55.7 | 34 |
| Turkey | 65.2 | 118 |
| Morocco | 57.7 | 176 |
| Other industrialised | 53.4 | 158 |
| Other non-industrialised | 58.8 | 177 |
| Total | 60.6 | 3296 |

aged 65 years and over. In this age group, the overall response rate was 60.6%, varying by ethnic group from 53.4% to 65.2% (see table 1). In this age group, response rates did not vary in an important way for ethnic group and another seven variables (sex, age, marital status, position in family, year of settlement in Amsterdam, borough of residence, and period of interview) that were known on the entire MPR sample (Cohen's $W^9$ < 0.09 in all cases); neither did they regarding all age groups combined.[10–12]

### POPULATION

In this study, people were categorised in seven groups on the basis of their registered country of birth to obtain groups of adequate size for further analysis that were socioculturally as much homogenous,[7 8] as could be reached with the available information. These groups concerned the Netherlands, Surinam, the Netherlands Antilles, Turkey, Morocco, other industrialised and other non-industrialised countries, and are further briefly called "ethnic groups". Surinam is a former Dutch colony in Latin America, with a mixed population of mainly black, Indonesian, Indian and Dutch ancestry. It gained independence in 1975, which gave rise to a large scale migration to the Netherlands. The Netherlands Antilles are isles in the Caribbean area, which still are a part of the Dutch state. They have a mixed black and white population. People from Turkey and Morocco came as labour migrants to the Netherlands in the sixties and early seventies, firstly only men on a temporary basis. Both groups are rather homogenous culturally. Other industrialised countries concern all members of the OECD in 1993, excluding Turkey. Other non-industrialised countries concern the rest of the world.

Respondents came from a random sample of the Amsterdam municipal population register (MPR). Registration of residents in this register is obligatory, including their country of birth. The sample concerned 8335 residents aged 16 years and over, excluding people living in care institutions, of whom 5121 (61.4%) could be interviewed by trained interviewers. The analysis is limited to the 3296 respondents aged 16–64 years, because most first generation immigrants are relatively young; especially among Turks and Moroccans, hardly anyone is

### DATA COLLECTION

Trained interviewers asked respondents about their health, lifestyles, use of health care, and SE position. About one week before the intended interview, intended respondents received a personal letter signed by the director of the Municipal Health Service on the aim of the interview and its intended date and time. A translation in Turkish, Moroccan or English was enclosed if necessary, depending on the registered country of birth. Translations of all written material were made using forward translation by native speakers and backward translation afterwards. People were called on twice if they were not at home at the intended time of the interview. Respondents from Morocco and Turkey were matched to interviewers of the same ethnic group and sex if possible. The survey was approved by the medical ethical committee of the Municipal Health Service and the municipal privacy committee.

Health status was measured by six indicators that were all dichotomised (cut off point). These were: self rated health ((very) good / fair or worse),[13 14] physical complaints (0–4/5–20),[15] mental health—that is, score on the 12 item version the General Health Questionnaire (GHQ) (0–1/2–12),[16 17] short-term physical limitations (0/1–60 days, preceding two months),[13 15] long term physical limitations (0/1–7),[15 18] body mass index (BMI) (normal, < 27/obese, ≥ 27 kg/m²).[13] Lifestyles concerned the current smoking of cigarettes (< 1/≥ 1 daily) and the use of alcohol during last week (< 1/≥1 consumption).[13] Use of health care concerned any use of five types of health care in the period preceding the interview: GP (two months), medical specialist (two months, not

*Table 2  Socioeconomic position and demographic characteristics of ethnic groups: percentages, adjusted to the age and sex distribution of all respondents*

| | Netherlands | Surinam | Netherlands Antilles | Turkey | Morocco | Other industrialised | Other non-industrialised | Total | Missings* | p Value† |
|---|---|---|---|---|---|---|---|---|---|---|
| Primary school only‡ | 18.5 | 26.5 | 30.7 | 82.1 | 74.1 | 19.0 | 28.9 | 24.6 | 51 | 0.000 |
| Unemployed labour force‡ | 9.2 | 30.5 | 24.2 | 35.3 | 33.2 | 11.2 | 26.8 | 13.0 | 35 | 0.000 |
| Semi/unskilled work‡¶ | 12.0 | 18.5 | 23.3 | 42.5 | 41.5 | 21.9 | 20.6 | 15.2 | 0 | 0.000 |
| Higher professional work‡¶ | 38.6 | 15.5 | 8.2 | 11.6 | 5.8 | 33.3 | 18.3 | 33.9 | 0 | 0.000 |
| Household income ≤ soc minimum‡ | 22.0 | 54.3 | 29.3 | 49.9 | 50.8 | 29.4 | 42.9 | 27.6 | 428 | 0.000 |
| Living single‡ | 32.0 | 22.2 | 18.5 | 8.6 | 8.0 | 24.3 | 15.5 | 28.0 | 16 | 0.000 |
| One parent family‡ | 6.5 | 27.0 | 18.9 | 4.3 | 13.4 | 10.0 | 11.4 | 8.5 | 16 | 0.000 |
| Mean age (y) | 38.3 | 36.2 | 35.5 | 33.0 | 35.5 | 38.9 | 35.6 | 37.7 | 0 | 0.000§ |
| Under 35 years | 45.8 | 50.3 | 44.1 | 61.9 | 49.4 | 41.8 | 48.0 | 46.7 | 0 | 0.02 |
| Male | 49.1 | 37.3 | 38.2 | 51.7 | 61.4 | 50.6 | 49.7 | 49.2 | 0 | 0.01 |
| Number | 2448 | 185 | 34 | 118 | 176 | 158 | 177 | 3296 | | |

*Number of missings.
†p Value for differences by country of birth, after adjustment for age, sex, and their interactions, if applicable ($\chi^2$ statistic).
‡Adjusted for age and sex to the entire group of respondents; crude percentages are available from the author.
§F statistic.
¶Of those who have paid work; number of missings regarding employment status is 35.

*Table 3   Reported health status, lifestyles, and use of health care of ethnic groups: percentages, adjusted to the age and sex distribution of all respondents★*

| | Netherlands | Surinam | Netherlands Antilles | Turkey | Morocco | Other industrialised | Other non-industrialised | Total | Missings† | p Value‡ |
|---|---|---|---|---|---|---|---|---|---|---|
| *Health status* | | | | | | | | | | |
| Poor self rated health | 18.8 | 30.0 | 28.7 | 43.7 | 39.1 | 21.1 | 23.2 | 21.9 | 137 | 0.000 |
| Physical complaints, ≥5 | 27.3 | 37.3 | 37.6 | 69.2 | 51.4 | 37.1 | 37.8 | 31.8 | 4 | 0.000 |
| Increased GHQ score | 31.2 | 35.4 | 30.4 | 46.4 | 38.1 | 34.5 | 38.9 | 32.9 | 116 | 0.006 |
| Long term limitation, ≥ 1 | 8.9 | 14.5 | 18.7 | 40.5 | 34.7 | 11.6 | 12.5 | 12.1 | 49 | 0.000 |
| Days ill, ≥ 1 | 20.8 | 22.6 | 9.0 | 30.5 | 27.4 | 24.4 | 20.9 | 21.6 | 38 | 0.037 |
| Obese (BMI ≥ 27 kg/m²) | 13.6 | 24.0 | 31.8 | 35.6 | 24.4 | 13.7 | 18.7 | 16.0 | 163 | 0.000 |
| *Lifestyles* | | | | | | | | | | |
| Smokes cigarettes | 45.2 | 30.1 | 31.9 | 49.1 | 14.1 | 46.3 | 30.5 | 42.0 | 130 | 0.000 |
| Uses alcohol | 78.1 | 43.5 | 52.3 | 26.3 | 7.5 | 78.1 | 52.0 | 68.8 | 90 | 0.000 |
| *Any use of health care* | | | | | | | | | | |
| GP | 38.0 | 46.2 | 22.5 | 56.1 | 54.3 | 44.4 | 49.6 | 40.7 | 15 | 0.000 |
| Medical specialist | 19.2 | 18.1 | 21.6 | 26.1 | 21.4 | 21.2 | 22.5 | 19.8 | 35 | 0.468 |
| Hospitalisation | 7.7 | 11.1 | 22.9 | 10.0 | 6.2 | 12.2 | 14.4 | 8.6 | 57 | 0.001 |
| Prescribed pharmaceutical | 37.5 | 40.8 | 30.4 | 59.1 | 52.5 | 40.1 | 42.9 | 39.6 | 21 | 0.000 |
| Hypnotic/sedative | 9.0 | 7.5 | 6.2 | 16.1 | 16.4 | 10.7 | 10.1 | 9.7 | 17 | 0.004 |

★Crude percentages are available from the author.
†Number of missings.
‡p Value for differences by country of birth, after adjustment for age, sex, and their interactions ($\chi^2$ statistic).

during hospitalisation), hospitalisation (one year), medically prescribed pharmaceuticals (three months, excluding oral contraceptives), and hypnotics or sedatives (three months).

SE position was measured by its three traditional indicators: educational level, occupational status, and income.[13][19] Educational level concerned the highest degree earned, in four levels.[13][14] Occupational status concerned the present occupation of people in five levels,[20] or, if none, their main activity as measure of economic position.[13] Income concerned household income in five levels, adapted for the number of persons who depended on it (one or more). Previous analyses have shown a strong inverse association between these indicators and health, both for Amsterdam[12] and for the entire Netherlands.[15] Finally, type of insurance, sickfund or private, was measured because it has been shown that people with a sickfund insurance use some types of health care more frequently.[15]

ANALYSIS
In the analysis, we firstly compared the seven ethnic groups regarding their background characteristics, and health status, lifestyles and use of health care, after adjustment for differences in age (in five categories) and sex.

Next, logistic regression was used to assess whether differences in health and lifestyles between immigrant groups and the indigenous population could be explained by SE factors. Finally, logistic regression with stepwise forward selection was used to assess whether differences in the use of health care between immigrant groups and the indigenous population could be explained by the same SE factors, or by health status or insurance status, or by a combination of these. Interactions between country of birth, and sex and age (in two categories) were separately examined. Respondents with missing values regarding explanatory variables were retained in all analyses by creating separate missing value categories. All analyses were performed using the SPSS/PC statistical package.[21]

## Results
Ethnic groups vary regarding SE position and background characteristics in a statistically very significant way (see table 2). Especially Moroccans and Turks are in an overall adverse position: their educational level is very low, as well as their occupational level and household income. Unemployment rates among those available for work are high. People born in the

*Table 4   Differences by ethnic group in reported health status, adjusted for age and sex, and additionally for educational level or other SE factors: odds ratios (OR) and 95% confidence intervals (CI), using the Netherlands born groups as reference category; statistically significant odds ratios in italic*

| | Adjustment | Surinam OR | 95% CI | Netherlands Antilles OR | 95% CI | Turkey OR | 95% CI | Morocco OR | 95% CI | Other industrialised OR | 95% CI | Other non-industrialised OR | 95% CI | p Value★ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Poor self rated health | Age/sex | *2.00* | (1.39, 2.87) | 1.85 | (0.83, 4.11) | *4.03* | (2.68, 6.06) | *3.14* | (2.23, 4.43) | 1.18 | (0.77, 1.79) | 1.35 | (0.91, 2.02) | 0.000 |
| | +Education† | *1.67* | (1.15, 2.41) | 1.61 | (0.72, 3.59) | *2.56* | (1.67, 3.92) | *2.21* | (1.52, 3.20) | 1.19 | (0.78, 1.83) | 1.31 | (0.88, 1.97) | 0.000 |
| | +Income‡ | *1.56* | (1.07, 2.28) | 1.87 | (0.84, 4.16) | *2.90* | (1.88, 4.47) | *2.16* | (1.49, 3.16) | 1.12 | (0.73, 1.72) | 1.13 | (0.75, 1.71) | 0.000 |
| | +Occ. status§ | *1.74* | (1.19, 2.53) | 1.61 | (0.70, 3.72) | *2.88* | (1.88, 4.40) | *2.15* | (1.49, 3.11) | 1.10 | (0.71, 1.70) | 1.28 | (0.84, 1.94) | 0.000 |
| Physical complaints, ≥ 5 | Age/Sex | *1.62* | (1.18, 2.24) | 1.63 | (0.80, 3.32) | *6.71* | (4.45, 10.11) | *3.04* | (2.20, 4.20) | *1.60* | (1.14, 2.26) | *1.68* | (1.21, 2.33) | 0.000 |
| | +Education† | *1.40* | (1.01, 1.94) | 1.46 | (0.71, 2.97) | *4.57* | (2.98, 7.00) | *2.16* | (1.53, 3.05) | *1.61* | (1.14, 2.28) | *1.61* | (1.15, 2.25) | 0.000 |
| Increased GHQ-score | Age/sex | 1.21 | (0.87, 1.68) | 0.97 | (0.45, 2.07) | *1.94* | (1.33, 2.82) | 1.37 | (0.99, 1.89) | 1.17 | (0.82, 1.66) | *1.41* | (1.01, 1.96) | 0.006 |
| | +Education† | 1.19 | (0.86, 1.66) | 0.93 | (0.43, 2.00) | *1.71* | (1.15, 2.54) | 1.31 | (0.93, 1.86) | 1.18 | (0.83, 1.68) | 1.39 | (1.00, 1.93) | 0.006 |
| Long term limitation, ≥ 1 | Age/sex | *1.89* | (1.17, 3.04) | *2.78* | (1.07, 7.19) | *13.06* | (8.15, 20.92) | *8.18* | (5.42, 12.33) | 1.40 | (0.83, 2.38) | 1.64 | (0.95, 2.83) | 0.000 |
| | +Education† | 1.55 | (0.96, 2.52) | 2.53 | (0.98, 6.52) | *7.98* | (4.86, 13.10) | *5.95* | (3.79, 9.33) | 1.49 | (0.87, 2.54) | 1.69 | (0.97, 2.94) | 0.000 |
| Days ill, ≥ 1 | Age/Sex | 1.11 | (0.78, 1.60) | 0.37 | (0.11, 1.23) | *1.68* | (1.12, 2.54) | *1.45* | (1.01, 2.07) | 1.23 | (0.84, 1.80) | 1.01 | (0.69, 1.48) | 0.037 |
| | +Education† | 1.03 | (0.72, 1.49) | 0.35 | (0.11, 1.16) | 1.49 | (0.96, 2.30) | 1.30 | (0.88, 1.91) | 1.23 | (0.84, 1.80) | 0.99 | (0.68, 1.46) | 0.203 |
| Obese (BMI ≥ 27 kg/m²) | Age/Sex | *2.09* | (1.49, 2.92) | *3.69* | (1.74, 7.85) | *4.26* | (2.78, 6.52) | *2.23* | (1.51, 3.30) | 1.07 | (0.74, 1.55) | 1.22 | (0.80, 1.88) | 0.000 |
| | +Education† | *1.71* | (1.14, 2.55) | *2.78* | (1.24, 6.24) | *2.45* | (1.56, 3.85) | 1.38 | (0.89, 2.13) | 1.05 | (0.64, 1.70) | 1.49 | (0.95, 2.33) | 0.000 |

★p Value for differences by country of birth, after adjustment for age, sex and their interactions, and for educational level or income or occupational level, if applicable; p values are based on the improvement of the fit of the logistic model by inclusion of country of birth ($\chi^2$ statistic).
†Highest degree earned in four levels: primary school, lower secondary school, higher secondary school, post-secondary education.
‡Income in five levels, adapted for the number of people who depend on it (1 or more).
§Occupational status, that is, present occupation in five levels; if no job: unemployed and looking for work, student, long term disabled, housekeeping, and retired.

*Table 5  Differences by ethnic group in reported lifestyles, adjusted for age and sex, and additionally for educational level or other SE factors: odds ratios (OR) and 95% confidence intervals (CI), using the Netherlands born groups as reference category; statistically significant odds ratios are in italics*

| | Adjustment | Surinam OR | 95% CI | Netherlands Antilles OR | 95% CI | Turkey OR | 95% CI | Morocco OR | 95% CI | Other industrialised OR | 95% CI | Other non-industrialised OR | 95% CI | p Value* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Smokes cigarettes, male | Age | 1.36 | (0.82, 2.25) | 0.76 | (0.25, 2.35) | *2.96* | *(1.68, 5.22)* | *0.38* | *(0.23, 0.61)* | 1.07 | (0.67, 1.73) | *0.56* | *(0.34, 0.90)* | 0.000 |
| | +Education† | 1.12 | (0.67, 1.88) | 0.65 | (0.21, 2.07) | *2.72* | *(1.50, 4.96)* | *0.34* | *(0.21, 0.57)* | 1.09 | (0.67, 1.78) | *0.56* | *(0.34, 0.92)* | 0.000 |
| Smokes cigarettes, female | Age | *0.24* | *(0.14, 0.39)* | 0.45 | (0.17, 1.18) | *0.43* | *(0.24, 0.78)* | *0.02* | *(0.00, 0.12)* | 1.01 | (0.62, 1.63) | *0.51* | *(0.32, 0.82)* | 0.000 |
| | +Education† | *0.19* | *(0.11, 0.31)* | 0.38 | (0.14, 1.01) | *0.28* | *(0.15, 0.53)* | *0.01* | *(0.00, 0.05)* | 0.94 | (0.57, 1.55) | *0.46* | *(0.29, 0.75)* | 0.000 |
| Uses alcohol | Age/sex | *0.20* | *(0.15, 0.28)* | *0.29* | *(0.14, 0.60)* | *0.09* | *(0.06, 0.13)* | *0.02* | *(0.01, 0.04)* | 1.01 | (0.66, 1.54) | *0.27* | *(0.19, 0.38)* | 0.000 |
| | +Education† | *0.24* | *(0.17, 0.34)* | *0.36* | *(0.18, 0.74)* | *0.14* | *(0.09, 0.22)* | *0.03* | *(0.02, 0.06)* | 1.02 | (0.67, 1.58) | *0.28* | *(0.20, 0.39)* | 0.000 |

*p Value for differences by country of birth, after adjustment for age, sex, and their interactions, and for educational level, if applicable; p values are based on the improvement of the fit of the logistic model by inclusion of country of birth ($\chi^2$ statistic).
†Highest degree earned in four levels: primary school, lower secondary school, higher secondary school, post-secondary education.

Netherlands and in other industrialised countries have by far the best SE position, the other ethnic groups are in between. With regard to background characteristics, in particular the Dutch are single very frequently but one parent families mostly occur among people born in a (former) Dutch colony. Furthermore, the proportion of men among Surinameses and Antilleans is low, mainly because of a low proportion of them in the MPR sample (40% for both groups).

Similarly large ethnic differences exist regarding health status, lifestyles, and use of health care (table 3). The prevalence of a poor reported health is almost consistently highest among Turks and Moroccans, and lowest among Dutch. In contrast, the prevalence of smoking and of any use of alcohol (and also: excessive use of alcohol, not shown) is highest among people born in the Netherlands and in other industrialised countries, though also among Turks with regard to smoking. Finally, Turks and Moroccans most frequently use GP care, prescribed pharmaceuticals and hypnotics/sedatives. The prevalence of hospitalisations is highest among Antilleans.

Logistic regression shows that the poor age/sex adjusted reported health status of first generation immigrants can be partially explained by their SE position but that most ethnic differences remain statistically significant. In the top rows of table 4, the effect of an adjustment for the various separate measures is shown, regarding self rated health. In general, adjustment for educational level yields the largest reduction in the size of the ethnic differences. Therefore, only these odds ratios (ORs) are shown in the next rows of table 4. None of the ethnic differences in health is modified by age or sex in a statistically significant way.

With regard to reported lifestyles, ethnic patterns of smoking differ by sex, as is shown by statistically significant interactions (p = 0.000) between sex and country of birth. Among women of all immigrant groups, excluding those born in (other) industrialised countries, the prevalence of current smoking is lower than among indigenous women. In contrast, among men, Turks have the highest prevalence of smoking, while men from Morocco and "other non-industrialised countries" have a lower prevalence than the indigenous Dutch. SE factors explain all differences in reported lifestyles only very partially, ethnic differences remaining highly significant. In table 5, the effect of adding educational level is shown as an example of this.

With regard to reported use of health care, some ethnic patterns differ by age group (table 6). p Values for the interaction between sex and country of birth for these outcomes are 0.0085 and 0.0121, respectively. Among the "elderly" (35–64 years), immigrants from Turkey,

*Table 6  Differences by ethnic group in reported use of health care, adjusted for age and sex, and additionally for educational level or other SE factors: odds ratios (OR) and 95% confidence intervals (CI), using the Netherlands born groups as reference category; statistically significant odds ratios are in italics*

| | Adjustment | Surinam OR | 95% CI | Netherlands Antilles OR | 95% CI | Turkey OR | 95% CI | Morocco OR | 95% CI | Other industrialised OR | 95% CI | Other non-industrialised OR | 95% CI | p Value* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GP, young | Age/sex | 0.95 | (0.60, 1.48) | 0.39 | (0.11, 1.39) | 1.60 | (0.95, 2.51) | 1.29 | (0.81, 2.05) | 0.96 | (0.57, 1.62) | *1.70* | *(1.10, 2.70)* | 0.070 |
| | +Education† | 0.83 | (0.52, 1.31) | 0.32 | (0.09, 1.17) | 1.22 | (0.72, 2.06) | 1.12 | (0.68, 1.84) | 0.94 | (0.55, 1.60) | *1.69* | *(1.07, 2.68)* | 0.136 |
| GP, old | Age/sex | 2.06 | (1.33, 3.18) | 0.56 | (0.20, 1.57) | 3.53 | (1.85, 6.75) | 3.00 | (1.90, 4.73) | 1.65 | (1.07, 2.55) | 1.54 | (1.00, 2.38) | 0.001 |
| | +Education† | *1.81* | *(1.16, 2.81)* | 0.54 | (0.19, 1.51) | *2.63* | *(1.36, 5.12)* | *2.11* | *(1.29, 3.43)* | *1.65* | *(1.07, 2.56)* | 1.50 | (0.96, 2.32) | 0.000 |
| | +Income‡ | *1.81* | *(1.15, 2.82)* | 0.55 | (0.20, 1.56) | *3.12* | *(1.61, 6.05)* | *2.57* | *(1.58, 4.19)* | *1.64* | *(1.06, 2.53)* | 1.43 | (0.92, 2.22) | 0.000 |
| | +Occ status§ | *1.95* | *(1.25, 3.04)* | 0.56 | (0.19, 1.60) | *3.17* | *(1.63, 6.13)* | *2.47* | *(1.54, 3.96)* | *1.64* | *(1.06, 2.55)* | 1.51 | (0.97, 2.35) | 0.000 |
| Medical specialist | Age/sex | 0.93 | (0.62, 1.38) | 1.17 | (0.50, 2.73) | 1.55 | (1.00, 2.42) | 1.16 | (0.78, 1.72) | 1.14 | (0.76, 1.70) | 1.24 | (0.84, 1.82) | 0.468 |
| | +Education† | 0.90 | (0.60, 1.35) | 1.13 | (0.49, 2.63) | 1.43 | (0.90, 2.28) | 1.02 | (0.67, 1.56) | 1.13 | (0.75, 1.69) | 1.21 | (0.83, 1.78) | 0.702 |
| Hospitalisation | Age/sex | 1.49 | (0.92, 2.42) | *3.45* | *(1.53, 7.77)* | 1.36 | (0.71, 2.59) | 0.79 | (0.41, 1.53) | *1.68* | *(1.01, 2.80)* | *2.05* | *(1.30, 3.24)* | 0.001 |
| | +Education† | 1.35 | (0.83, 2.19) | *3.10* | *(1.36, 7.04)* | 0.99 | (0.50, 1.93) | 0.63 | (0.32, 1.25) | *1.71* | *(1.02, 2.84)* | *1.99* | *(1.25, 3.15)* | 0.002 |
| Prescribed pharmaceutical, young | Age/Sex | 0.67 | (0.40, 1.11) | 0.52 | (0.14, 1.87) | *1.77* | *(1.09, 2.88)* | 1.39 | (0.86, 2.24) | 1.01 | (0.58, 1.74) | 1.11 | (0.69, 1.79) | 0.000 |
| | +Education† | *0.58* | *(0.34, 0.97)* | 0.42 | (0.12, 1.53) | 1.19 | (0.70, 2.01) | 1.14 | (0.68, 1.91) | 0.99 | (0.57, 1.73) | 1.05 | (0.65, 1.71) | 0.331 |
| Prescribed pharmaceutical, old | Age/sex | *1.82* | *(1.17, 2.84)* | 0.89 | (0.34, 2.32) | *4.75* | *(2.35, 9.59)* | *2.61* | *(1.64, 4.15)* | 1.22 | (0.79, 1.90) | 1.44 | (0.92, 2.23) | 0.000 |
| | +Education† | *1.65* | *(1.05, 2.58)* | 0.87 | (0.33, 2.25) | *3.69* | *(1.80, 7.57)* | *1.89* | *(1.15, 3.12)* | 1.21 | (0.78, 1.89) | 1.39 | (0.89, 2.17) | 0.001 |
| Hypnotic/sedative | Age/sex | 0.81 | (0.46, 1.44) | 0.65 | (0.15, 2.76) | *2.17* | *(1.25, 3.76)* | *2.16* | *(1.37, 3.40)* | 1.21 | (0.71, 2.06) | 1.15 | (0.67, 1.98) | 0.004 |
| | +Education† | 0.70 | (0.39, 1.25) | 0.59 | (0.14, 2.53) | 1.46 | (0.82, 2.61) | 1.40 | (0.86, 2.30) | 1.20 | (0.70, 2.05) | 1.08 | (0.62, 1.86) | 0.432 |

* p Value for differences by country of birth, after adjustment for age, sex and their interactions, and for educational level or income or occupational level, if applicable; p values are based on the improvement of the fit of the logistic model by inclusion of country of birth ($\chi^2$ statistic).
† Highest degree earned in four levels: primary school, lower secondary school, higher secondary school, post-secondary education.
‡ Income in five levels, adapted for the number of people which depend on it (1 or more).
§ Occupational status, that is, present occupation in five levels; if no job: unemployed and looking for work, student, long term disabled, housekeeping, and retired.

Morocco, and Surinam, have a much higher prevalence of contact with a GP and use of prescribed pharmaceuticals than indigenous Dutch. Among the "young" (16–34 years) ethnic differences are much smaller. Ethnic differences with regard to hospitalisations and use of hypnotics/sedatives are smaller, and lacking with regard to contacts with medical specialists. Again, out of all SE measures, adjustment for educational level yields the largest reductions in the size of the ethnic differences. Reductions are especially large for the use of GP care and of prescribed pharmaceuticals among the young, and the use of hypnotics/sedatives among all age groups (table 6).

Finally, regarding use of health care, the relative effect of an adjustment for educational level, health status and insurance status, in addition to age and sex, was studied. Regarding all outcomes, health has the statistically most significant contribution to the models (p = 0.0000 in all cases), which also leads to the largest reductions regarding ethnic differences. Regarding pharmaceuticals among the young and hypnotics/sedatives, educational level has a statistically significant (p < 0.05) contribution in addition to health, which hardly changes ORs, however. Regarding GP care and pharmaceuticals among the elderly, and hospitalisations, insurance status contributes to the models in a statistically significant way after inclusion of health, but educational level does not subsequently (table 7). Ethnic differences in the use of GP care and pharmaceuticals can mostly be explained by health status; insurance status and SE position contribute only slightly. Only for hospitalisations, statistically significant ethnic differences remain: the prevalence of hospitalisations is higher than expected for Antilleans and people born in other non-industrialised countries, and lower than expected for Moroccans.

## Discussion

This study shows that most first generation immigrants report a poorer health and higher use of health care than the indigenous population, which SE factors explain only partially.

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KEY POINTS
- Socioeconomic circumstances of ethnic minorities often explain their adverse health status instead of racial and biological factors.
- Several immigrant groups in the Netherlands have a poor self rated health and a higher use of (primary) health care.
- Main groups in an adverse position are people born in former Dutch colonies and in Turkey and Morocco.
- This study shows that socioeconomic factors partially explain the poor health status of these groups.
- The poor health of immigrants explains most of their higher use of health care and this use may even increase in future.

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Especially immigrants from Turkey and Morocco have an adverse position, and to a lower extent those from (former) Dutch colonies and other non-industrialised countries. The prevalence of smoking varies between ethnic groups by sex, and is relatively high among indigenous women. The higher use of health care especially concerns older immigrants; most of it can be explained by their poorer health. Only for hospital care, important ethnic differences remain.

A selective non-response among healthy immigrants might theoretically explain our results. However, response rates vary little by ethnic group, and little as well by another seven background variables that were known on the entire sample. Information on response rates by individual SE position was not available, but response rates hardly varied regarding borough of residence, and thus regarding area deprivation.[12 22] Furthermore, the use of oral interviews meant that the limited reading ability of some people did not hamper their response.[4] Finally, the embedding of this study in a general community survey prevents a selection bias within Amsterdam as a result of sampling only areas with high densities of ethnic minorities. Ecob and Williams showed that in these areas, the reported health of these

*Table 7  Differences by ethnic group in reported use of health care, adjusted for age and sex, and cumulatively adjusted for reported health status, insurance status and educational level by stepwise introduction of the latter three variables to the models: odds ratios (OR) and 95% confidence intervals (CI), using the Netherlands born groups as reference category; statistically significant odds ratios are in italics*

| | Addition* | Surinam OR 95% CI | Netherlands Antilles OR 95% CI | Turkey OR 95% CI | Morocco OR 95% CI | Other industrialised OR 95% CI | Other non-industrailised OR 95% CI | p Value† |
|---|---|---|---|---|---|---|---|---|
| GP, old | +Health‡ 0.000 | 1.51 (0.95, 2.40) | 0.36 (0.12, 1.10) | 1.52 (0.75, 3.07) | *1.80 (1.09, 2.98)* | 1.57 (0.99, 2.50) | 1.34 (0.84, 2.14) | 0.014 |
| | +Insurance§ 0.005 | 1.43 (0.90, 2.28) | 0.38 (0.12, 1.16) | 1.42 (0.70, 2.87) | *1.67 (1.00, 2.77)* | 1.54 (0.97, 2.44) | 1.27 (0.79, 2.03) | 0.048 |
| | +Education¶ 0.199 | 1.39 (0.87, 2.23) | 0.38 (0.12, 1.18) | 1.26 (0.61, 2.58) | 1.38 (0.81, 2.35) | 1.52 (0.95, 2.43) | 1.26 (0.78, 2.02) | 0.145 |
| Hospitalisation | +Health‡ 0.000 | 1.29 (0.79, 2.12) | *3.19 (1.36, 7.47)* | 0.75 (0.38, 1.47) | *0.52 (0.26, 1.04)* | 1.63 (0.97, 2.75) | *1.91 (1.19, 3.06)* | 0.001 |
| | +Insurance§ 0.007 | 1.24 (0.76, 2.05) | *3.34 (1.41, 7.94)* | 0.70 (0.35, 1.38) | *0.49 (0.24, 0.98)* | 1.61 (0.95, 2.72) | *1.85 (1.15, 2.96)* | 0.001 |
| | +Education¶ 0.509 | 1.20 (0.73, 1.99) | *3.21 (1.35, 7.61)* | 0.62 (0.31, 1.25) | *0.45 (0.22, 0.92)* | 1.63 (0.97, 2.76) | *1.84 (1.14, 2.96)* | 0.001 |
| Prescribed pharmaceutical, old | +Health‡ 0.000 | 1.24 (0.77, 2.01) | 0.63 (0.22, 1.80) | 1.89 (0.87, 4.12) | 1.33 (0.77, 2.28) | 1.08 (0.66, 1.75) | 1.30 (0.79, 2.12) | 0.471 |
| | +Insurance§ 0.023 | 1.19 (0.73, 1.93) | 0.68 (0.24, 1.95) | 1.79 (0.82, 3.91) | 1.26 (0.73, 2.17) | 1.06 (0.65, 1.71) | 1.24 (0.76, 2.04) | 0.666 |
| | +Education¶ 0.415 | 1.19 (0.73, 1.93) | 0.69 (0.24, 1.99) | 1.65 (0.75, 3.65) | 1.06 (0.59, 1.88) | 1.03 (0.64, 1.68) | 1.21 (0.73, 2.00) | 0.819 |

*p Value for addition of this characteristic to the model, in addition to age, sex and their interactions, and all of the aforementioned characteristics, if applicable; p values are based on the improvement of the fit of the logistic model (χ² statistic).
†p Value for differences by country of birth, after adjustment for age, sex and their interactions, and for health and insurance status and educational level, if applicable; p values are based on the improvement of the fit of the logistic model by inclusion of country of birth (χ² statistic).
‡Reported health status: self rated health, physical complaints, mental health, and long term physical limitations, all dichotomised according to cut off points as mentioned in the methods section.
§Sickfund or private insurance.
¶Highest degree earned in four levels: primary school, lower secondary school, higher secondary school, post-secondary education.

minorities is relatively poor.[23] Further research is needed, however, to discover if Amsterdam as a whole could be considered as such a high density area because of its rather large immigrant population.

The use of registered country of birth as an indicator of ethnicity prevents bias caused by selective attribution of ethnicity as may occur in self assessment[1] [24]; no errors or missings were met regarding this variable. For some of the ethnic groups studied, it also yields culturally homogenous groups, especially for Turks and Moroccans. Among mixed groups, like Surinameses and Antilleans, specific subgroups of interest cannot be discerned, but other criteria, such as self identification, offer an only partial solution to this problem.[24] [25] Besides, these groups probably have many common characteristics because of their shared recent migration history.

This study shows that SE factors only partially explain the poor reported health of certain ethnic groups. A similar result has been found in the USA for the poor reported health of black people but not of Hispanic people,[26] and in Sweden for the poor health of labour migrants and refugees.[27] These residual ethnic differences can be explained in four ways. Firstly, the SE indicators that were used may have a different meaning for various ethnic groups or may be poorly measured for some of them. For instance, regarding education in the country of birth, levels may be difficult to compare, especially regarding people from Turkey, Morocco and "other non-industrialised countries", even though detailed instructions were given regarding the equivalence of educational levels. Despite this, educational level had the highest explanatory power for ethnic differences, maybe because a higher educational level improves the potential of immigrants to assimilate in the host country and to benefit from health care. Regarding household income, a larger mean family size among immigrants may cause a lower mean personal income for them at a given household income. Additional analyses show that a more detailed accounting for family size in income decreases ORs for Moroccans and Turks people by an additional 10% regarding GP care among the elderly. However, regarding health status and other measures of use of health care, differences were less than 5%, and in both directions. Regarding occupational status, ethnic differences in measurement will be generally small because most respondents have had a paid job in the Netherlands, or never have had any. In conclusion, differences regarding the measurement of SE position offer an only partial explanation for the remaining ethnic differences after adjustment for SE position.

Secondly, biological factors may contribute to ethnic differences in health, for instance a poor health status at the moment of migration. However, especially men from Morocco and Turkey were mainly selected as labourers and thus had to be healthy at the moment of migration, but they experience a similar poor health. Biological differences based on racial—that is, genetic—differences are even more unlikely as the groups reporting the most adverse health, Turks and Moroccans, are mainly white, like the indigenous Dutch.

A third explanation concerns the poor living and working conditions as well as discrimination to which these immigrant groups have been exposed.[4] [28] In this case, a longer length of stay in the host country should lead to a relatively poorer health, which is found indeed by Williams in a study on people from the Indian subcontinent in Glasgow.[29] In our study, we did not measure length of stay but at least for Moroccan and Turkish men age should be a good proxy of it, and age did not modify ethnic differences in reported health.

Finally, cultural factors may contribute. Regarding lifestyles, this may explain both the ethnic differences as found and their modification by sex. For instance, the use of alcohol is strictly forbidden among Islamic people like (most of) the Moroccans and Turks. Cultural differences in the perception and reporting might also explain some results as all outcomes concerned subjective measures. Evidence on their cross cultural validity is limited. For the GHQ, most,[16] [17] though not all,[30] available evidence shows a similar validity to detect psychiatric disorders in various populations. For self rated health, qualitative research shows some differences in the referent for answering, though differences are small and may even reflect real differences in health.[31] With regard to elderly persons, ethnic differences in the reporting of health status seem to be similarly relatively small.[32] Furthermore, our study shows a high concordance between the self assessed health among various groups and the resulting behaviour: the use of health care is highest among the ethnic groups that report the poorest health. Finally, only results regarding the current situation were presented to prevent any bias caused by ethnic differences in recall, for instance regarding smoking history. Notwithstanding this, additional research is needed on cross cultural differences in the reporting of the various outcomes used.

This study generally confirms the results of previous studies on reported health status and use of health care among the main immigrant groups in the Netherlands.[4] [6] It shows a poorer health and higher use of health care among Turks and Moroccans, and to a lower extent among Surinameses and Antilleans (though relatively few of the latter were included). However, it also shows that immigrants from (other) industrialised countries do not have an adverse position, either in their SE position or in their health status. Despite this, they also use some types of health care more frequently, like GP care among the elderly and hospital care. This shows that any migration process may lead to higher health needs, even among relatively advantaged groups. The loss of social ties and cultural differences, which are inherent to any migration process may explain this.

The use of health care of the various immigrant groups generally fits with their poor health. They use more health care but this additional use of care can mostly be explained by their poor reported health. It may be

inferred that their access to these types of care is sufficient. However, their greater use of hospital care cannot be explained by these factors. This may be because of a higher prevalence of more severe health problems among them, which is reflected by higher death rates, especially among the young.[4 33] Furthermore, hospitalisations because of severe mental disorders occur more frequently among them too.[34]

The ethnic differences as found have important public health implications. Regarding lifestyles, the healthy behaviour of most immigrants regarding smoking should be maintained, especially regarding women, but the high prevalence of smoking among Turkish men deserves attention. Regarding health status, the adverse SE position of immigrants seems to be an important explanatory variable. This may imply a poor health (and resulting higher use of care) among the second generation as well, especially regarding Moroccans and Turks who continue to have an adverse SE position. Finally, the relatively high use of health care among elderly immigrants implies that the workload attributable to immigrants may increase in future, especially regarding GP care in urban areas where most ethnic groups concentrate.[4 35] Adequate health planning is necessary to anticipate this public health challenge.

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