Associations between healthcare consumption in country of origin and in country of residence by people with Turkish and Moroccan backgrounds living in the Netherlands: the HELIUS study

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Background: In Europe, a substantial percentage of the 22 million inhabitants with histories of migration from non-European countries utilize healthcare in their countries of origin. That could reflect avoidance of healthcare in the country of residence, but this has not been studied previously. **Methods:** We linked Dutch healthcare reimbursement data to the multi-ethnic population-based data from the HELIUS study conducted in Amsterdam. In multivariable logistic regression and negative binomial generalized estimating equation (GEE) analyses, we examined associations between healthcare use in country of origin and in country of residence by people with Turkish and with Moroccan backgrounds ($N = 2920$ and $N = 3031$, respectively) in the period 2010–15. **Results:** Participants with Turkish and Moroccan backgrounds who utilized healthcare one or multiple times in the country of origin ($n = 1335$ and $n = 558$, respectively) were found to be more likely, in comparison with non-users ($n = 1585$, $n = 2473$), to be frequent attenders of services by general practitioners, medical specialists and/or allied health professionals in the Netherlands [odds ratios between 1.21 (95% CI 0.91–1.60) and 3.15 (95% CI 2.38–4.16)]. GEE analyses showed similar results. **Conclusion:** People with Turkish or Moroccan backgrounds living in the Netherlands who use healthcare in their countries of origin are more likely than non-users to be higher users of healthcare in the Netherlands. We thus found no indications for avoidance of healthcare in the country of residence.

Introduction

In Europe, 22 million inhabitants have histories of migration from non-European countries.[1,2] Immigrants may stay in touch with their country of origin by upholding traditions and social contacts. Such transnational ties may be further anchored by regular travel between country of residence and the country of origin (transnationalism).[3] During visits to the latter, people may use public services, including marriage legalizations, tax payments, property management and healthcare.

Several European studies have focussed on the occurrence[4,5] and the motivations[6,7] for healthcare use by former migrants in their countries of origin. Occurrence varied from 9.8 to 26.6%.[4,5] Motivations were identified into two qualitative studies: familiarity of care and available opportunity, perception of quality of services, access to and perceived need for specialist care, and unfulfilled expectations of healthcare in the country of residence.[6,7]

Less is known about the consequences such cross-border healthcare use might have for the uptake of healthcare in the country of residence. Two distinctions can be made in possible effects: country-of-origin healthcare might be 'complementary' to country-of-residence care or it might indicate 'avoidance' of the latter. Should it be complementary (for instance for second opinions or, during longer stays, routine follow-up consultations for pre-existing chronic conditions), then it may merely be a concomitant of transnationalism. However, should the cross-border care indicate actual avoidance of healthcare in the country of residence, it could be hazardous to the health of those involved. In

a previous study regarding motivations, some interviewees reported that they postponed GP visits in their country of residence because of unfulfilled expectations or difficulties of obtaining specialist referrals.[7] If care is avoided due to such perceived access barriers, patients may postpone necessary doctors' visits until they return to their country of origin. Long-term treatments that need regular follow-up consultations may be compromised. Moreover, if medical record transfers between countries are lacking, the risk of iatrogenic events increases. Diagnostic work-ups could be unnecessarily repeated, interactions between medications missed or treatments given that are contraindicated.

In the Netherlands, 12% of the population have histories of immigration, including many residents of Turkish or Moroccan origin.[8] Migration from Turkey and Morocco was encouraged in the 1960s and early 1970s to fill labour shortages in unskilled occupations. The initial period of labour migration was followed by a second period (1970–80) in which many such 'guest workers' brought their spouses and children to the Netherlands.[9] They now form large migrant groups, not only in the Netherlands but also in other West European countries (Belgium, France, Spain, Italy and Germany). In a previous study, people in those groups (21 and 10%, respectively) reported substantial healthcare use in their countries of origin.[4] Linkage of reimbursement data (from the Achmea Health Database) to data from the HELIUS study (Healthy Life in an Urban Setting)[9,10] has enabled us to investigate the relationship between their healthcare use in the countries of origin and in the country of residence. We hypothesized that residents of the Netherlands with

Turkish or Moroccan backgrounds who utilize healthcare in the country of origin would be less likely to use healthcare in the Netherlands than their counterparts who do not use cross-border care, possibly indicating avoidance of healthcare in the country of residence.

Methods

The HELIUS study

The HELIUS study is a multi-ethnic cohort study conducted in Amsterdam.[9,10] In brief, baseline data were collected between 2011 and 2015 for nearly 25 000 individuals of Dutch, Surinamese, Ghanaian, Turkish or Moroccan ethnic origin. Potential participants in the 18- to 70 age range were randomly sampled with stratification by ethnic origin from the Amsterdam municipal population register (GBA). Non-response analyses showed no difference between responders and non-responders in terms of sociodemographic variables. The HELIUS study was approved by the Ethics Review Board of the Academic Medical Centre, Amsterdam (2010_100, protocol ID NL32251.018.10).

Study sample in the current analysis

For the current study, we linked HELIUS data with reimbursement data from the Dutch Achmea Health Database from 1 January 2010 to 30 April 2016. To guarantee participant privacy, a trusted third party linked the data, matching it by encrypted citizen service number and returned it without retraceable identifiers. Of the 22 165 participants who completed the questionnaire and underwent a physical examination, 19 932 (90%) gave permission to link their data to registry data, but 38 had missing citizen service numbers. A total of 15 461 participants could be linked, of whom 2920 were of Turkish and 3031 of Moroccan ethnic origin.

Ethnic origin and migration generation

Ethnic origin of HELIUS participants was defined by country-of-birth criteria,[11] using the municipal register data. Individuals were classified as being of Turkish origin if they were born in Turkey and had at least one parent born in Turkey (first generation) or if they were born in the Netherlands and both parents were born in Turkey (second generation). An analogous procedure determined Moroccan origin.

Healthcare use in the Netherlands

The Achmea Health Database contains data on date, duration and type of healthcare use inside and outside the Netherlands. First, we created a dichotomous variable indicating whether a participant had visited their Dutch GP during the 2010–15 period. Second, we calculated frequent use of GP care over that period using the method defined by Smits et al.[12] It divides participants into four age groups (18–30, 31–45, 46–60, 61+) and labels the top 10% of GP care users within each age group as 'frequent attenders'. We calculated frequent attenders for each year, age group and ethnicity. If a participant was a frequent attender in at least one of the years 2010–15 that participant was labelled a frequent GP attender for the entire 2010–15 period. Analogous variables were defined for allied healthcare and specialist medical care.

Healthcare use in the country of origin

We also calculated a categorical variable for reimbursed care in countries of origin over 2010–15. Participants were categorized as having had (i) no reimbursed healthcare in the country of origin during the period in question, (ii) one instance of reimbursed care or (iii) multiple reimbursements.

Sociodemographic variables and health status

The following sociodemographic variables were obtained from HELIUS: gender, marital status, level of education and employment status. Marital status was categorized into five categories: (i) married or in registered partnership, (ii) cohabiting, (iii) never married, (iv) divorced or separated and (v) widowed. Education level was based on highest attainment with four categories: (i) no education or primary schooling only, (ii) lower vocational or lower secondary schooling, (iii) intermediate vocational or intermediate or higher secondary education and (iv) higher professional or university education. Employment status was categorized as (i) employed, (ii) unemployed (seeking work and/or receiving benefit), (iii) not in labour force (retired, full-time homemaker, student) and (iv) incapacitated.

We used general mental health status, physical health status and number of chronic conditions as indicators of participants' perceived need for care. General mental and physical health statuses were measured by the 12-Item Short Form Survey (SF-12).[13] It scores the mental (MCS) and physical state (PCS) of an individual in comparison to the general population (range 0–100). Previous research has shown that the SF-12 discriminates well in the Turkish and Moroccan groups, but that inequalities in physical health when compared with the Dutch group may be somewhat overestimated.[14] The number of self-reported chronic conditions (range 0–21) was calculated on the basis of the common chronic conditions questionnaire used in the Amsterdam Health Monitoring Survey.[15]

Possible explanatory variables

We selected several variables assessed in HELIUS that might be mediators in the causal pathway of cross-border healthcare use and frequency of use of the Dutch healthcare system: self-reported degree of difficulty with the Dutch language, differential cultural orientation and degree of satisfaction with Dutch GP care.

Difficulty with the Dutch language was assessed with two questions regarding perceived problems in conversation and in reading: 'Do you find it hard to have a conversation in Dutch?' and 'If you read a newspaper, letters or leaflets in Dutch, do you find it hard to understand the language? ' A participant was considered to have no difficulty if both questions were answered as 'No, never'.

Cultural orientation was based on the Psychological Acculturation Scale.[16] Ten statements regarding the Dutch culture and 10 similar statements regarding the culture of origin were rated with the answer options of (i) totally disagree, (ii) disagree, (iii) neutral, (iv) agree and (v) totally agree (Supplementary Addendum I). Mean scores were calculated for the 10 items each pertaining to Dutch culture orientation and to culture-of-origin orientation. If one item was missing, it was replaced by the mean of the other nine items; if more than one item was missing, the mean score was not calculated. A mean score of 3.5 or higher on the scales was considered orientation to that particular culture. Subsequently, following Berry's categorization, participants were rated as integrated, assimilated, separated or marginalized.[17]

Satisfaction with one's Dutch GP was categorized with the terms (i) dissatisfied, (ii) slightly dissatisfied, (iii) reasonably satisfied, (iv) quite satisfied and (v) very satisfied.

Statistical analysis

Characteristics and healthcare use in the sample are described in table 1 and distinguished by ethnic group and by the use of country-of-origin healthcare, using means for continuous and percentages for categorical variables. We used multivariable stepwise logistic regression analyses to examine the relationship between healthcare use in country of origin and in country of residence in 2010–15. The odds ratios (ORs) for three models are reported in

Table 1 Characteristics of the study sample by ethnicity and by healthcare use in the country of origin

	Turkish			Moroccan		
	Healthcare use in country of origin[a]			Healthcare use in country of origin[a]		
	Total	None	Once or multiple	Total	None	Once or multiple
Number of participants (*n*)	2920	1585	1335	3031	2473	558
Age, mean (SD)	40.8 (12.3)	38.9 (12.2)	43.1 (12.0)	41.0 (13.2)	39.3 (12.8)	48.4 (12.1
Gender (% female)	54.6	49.0	61.1	60.7	59.4	66.1
Migration generation (% first generation)	72.7	65.6	81.1	70.8	66.8	88.7
Marital status (%)						
Married or in registered partnership	62.9	55.9	71.4	59.0	55.7	73.7
Cohabiting	3.2	4.1	2.0	2.8	3.1	1.4
Never married	19.8	25.5	13.0	25.4	29.0	9.4
Divorced or separated	11.4	12.4	10.2	11.1	10.7	13.0
Widowed	2.8	2.2	3.5	1.7	1.5	2.5
Education level (%)						
Primary or no schooling	33.8	26.2	42.8	34.0	29.6	53.9
Lower vocational schooling	25.8	27.4	23.9	18.4	19.1	15.4
Secondary education	28.7	31.1	25.8	33.3	35.4	23.8
Higher education	11.8	15.3	7.5	14.3	15.9	6.9
Employment status (%)						
Employed	51.2	58.1	43.0	46.6	50.8	28.1
Not in labour force	24.5	20.0	29.8	28.5	26.2	38.5
Receiving welfare benefit	15.7	15.4	16.1	16.5	16.1	18.3
Incapacitated	8.6	6.5	11.2	8.4	6.9	15.0
SF-12 MCS, range 0–100, mean (SD)	44.6 (11.2)	45.8 (10.7)	43.2 (11.7)	45.7 (10.7)	46.4 (10.4)	42.3 (11.3)
SF-12 PCS, range 0–100, mean (SD)	44.9 (10.6)	47.1 (9.6)	42.3 (11.1)	45.6 (10.2)	46.8 (9.7)	40.2 (10.8)
Number of self-reported chronic conditions, range 0–21, median (IQR)	3 (1–6)	2 (2–4)	4 (1–7)	2 (0–4)	2 (0–3)	4 (2–6)
Most common self-reported chronic conditions (%)						
Diabetes mellitus	7.6	5.4	11.5	9.2	8.5	16.6
Migraine or severe headaches	14.2	10.8	19.0	13.0	11.2	21.5
Severe or chronic fatigue	17.4	13.3	23.9	11.6	10.1	19.7
Hypertension	12.5	9.7	18.2	10.2	9.1	20.8
Asthma or COPD (chronic obstructive pulmonary disease)	12.7	10.2	16.8	9.8	8.8	14.9
Serious or persistent back disorder (including slipped disc)	17.1	12.1	23.8	10.5	8.5	20.5
Worn joints (arthrosis, osteoarthritis) in the hips and/or knees	12.2	9.2	17.7	9.2	7.5	20.5
Serious or persistent neck or shoulder disorders	15.6	11.0	22.4	10.0	8.8	17.9
Difficulty with Dutch language (% yes)	63.0	54.4	73.3	48.9	43.5	73.2
Cultural orientation (%)						
Integrated	41.1	44.1	37.6	46.0	48.6	39.4
Assimilated	4.5	6.2	2.4	7.5	8.5	3.8
Separated	46.2	40.6	52.9	32.0	30.0	44.6
Marginalized	8.2	9.1	7.1	12.5	12.9	12.2
Satisfaction with Dutch GP (%)						
Dissatisfied	3.8	3.7	3.8	4.0	3.6	5.7
Slightly dissatisfied	11.4	11.0	12.0	8.1	8.0	8.3
Reasonably satisfied	33.3	33.9	32.6	27.6	26.9	30.5
Quite satisfied	25.1	26.9	22.9	31.7	32.5	28.2
Very satisfied	26.4	24.5	28.7	28.7	29.0	27.3
Healthcare use in country of origin[a]						
None (%)	54.3			81.6		
Once (%)	12.1			6.8		
Multiple (%)	33.4			11.5		
Healthcare use in country of residence (the Netherlands)[a]						
GP care (% yes)	94.3	90.0	99.6	93.7	92.3	100
Allied healthcare (% yes)	63.5	51.2	78.1	59.7	55.0	81.0
Specialist medical care (% yes)	79.7	69.2	92.1	75.6	71.3	94.4
Frequent user of GP care (% yes)	30.7	22.5	40.4	32.1	28.1	49.6
Frequent user of allied healthcare (% yes)	29.9	23.0	38.1	30.7	27.2	46.2
Frequent user of specialist medical care (% yes)	44.8	33.9	57.8	48.6	44.4	67.0

a: Based on reimbursed healthcare use in 2010–15 period.

table 2. We regarded gender, marital status, migration generation, education level and employment status as possible confounders and adjusted for them in model I. In model II, we additionally adjusted for the perceived healthcare needs of participants (MCS, PCS and number of chronic conditions). We regarded self-reported difficulty with Dutch language, cultural orientation and satisfaction with Dutch GP care as potential mediators between healthcare use in the country of origin and the frequency of Dutch healthcare use. We included these in the final model (III).

When overdispersion is suspected [e.g. if the data include many respondents categorized as 'zero' (as, in our case, number of visits to Dutch GP, allied or specialist care)], a negative binomial approach is advised for better calculation of the associations and corresponding confidence intervals. We therefore additionally applied a negative binomial generalized estimating equations (GEE) model to further examine the relationship between country-of-origin and country-of-residence healthcare use. This regression method corrects for within-subject correlations by including a pre-specified correlation

Table 2 Associations of healthcare use in the country of origin with healthcare use in the Netherlands by participants of Turkish and Moroccan origin

Participants of Turkish origin, *N* = 2920			Model I	Model II	Model III
	Frequent attenders in GP care[a]				
	No	Yes			
Healthcare use in country of origin[a]					
No	1236 (42.3%)	357 (12.2%)			
Once	237 (8.1%)	115 (3.9%)	1.79 (1.36–2.34)	1.66 (1.26–2.20)	1.65 (1.25–2.19)
Multiple	551 (18.9%)	896 (30.7%)	2.53 (2.08–3.08)	2.16 (1.76–2.65)	2.17 (1.77–2.67)
	Frequent attenders in allied healthcare[a]				
Healthcare use in country of origin[a]	No	Yes			
No	1226 (42.0%)	367 (12.6%)			
Once	249 (8.5%)	103 (3.5%)	1.29 (0.97–1.70)	1.21 (0.91–1.60)	1.20 (0.91–1.60)
Multiple	571 (19.6%)	404 (13.8%)	2.20 (1.81–2.67)	1.93 (1.58–2.36)	1.92 (1.57–2.35)
	Frequent attenders in specialist medical care[a]				
Healthcare use in country of origin[a]	No	Yes			
No	1052 (36.0%)	541 (18.5%)			
Once	164 (5.6%)	188 (6.4%)	2.32 (1.80–2.99)	2.24 (1.73–2.90)	2.26 (1.75–2.93)
Multiple	395 (13.5%)	580 (19.9%)	2.90 (2.40–3.50)	2.58 (2.13–3.12)	2.62 (2.16–3.18)
Participants of Moroccan origin, *N*=3031					
	Frequent attenders in GP care[a]				
Healthcare use in country of origin[a]	No	Yes			
No	1779 (58.7%)	698 (23.0%)			
Once	106 (3.5%)	99 (3.3%)	2.49 (1.82–3.41)	2.15 (1.55–2.98)	2.14 (1.54–2.97)
Multiple	173 (5.7%)	176 (5.8%)	2.84 (2.18–3.71)	2.32 (1.76–3.06)	2.35 (1.78–3.11)
	Frequent attenders in allied healthcare[a]				
Healthcare use in country of origin[a]	No	Yes			
No	1803 (59.5%)	674 (45.4%)			
Once	118 (3.9%)	87 (2.4%)	1.92 (1.41–2.63)	1.70 (1.23–2.34)	1.71 (1.24–2.36)
Multiple	180 (5.9%)	169 (3.6%)	2.23 (1.72–2.90)	1.89 (1.44–2.47)	1.88 (1.43–2.47)
	Frequent attenders in specialist medical care[a]				
Healthcare use in country of origin[a]	No	Yes			
None	1376 (45.4%)	1101 (36.3%)			
Once	74 (2.4%)	131 (4.3%)	2.26 (1.64–3.12)	2.01 (1.44–2.79)	2.04 (1.46–2.84)
Multiple	109 (3.6%)	240 (7.9%)	3.15 (2.38–4.16)	2.66 (2.00–3.54)	2.71 (2.03–3.61)

The reported numbers are ORs with their corresponding 95% confidence intervals. Model I: adjusted for age, gender, marital status, migration generation, education level and employment status. Model II: Model I additionally adjusted for SF-12 MCS, SF-12 PCS and number of self-reported chronic conditions. Model III: Model II additionally adjusted for difficulty with Dutch language, cultural orientation and satisfaction with Dutch GP.
a: Based on reimbursed healthcare use in 2010–15 period.

structure in the analysis. For all outcome measures, an exchangeable structure showed the best fit. We adjusted for the same group of variables as in the logistic regression analyses. Analyses were performed with IBM SPSS Statistics, version 25.

Results

Baseline characteristics of the study sample

Among Turkish participants, 60% had lower vocational, primary or no schooling and 63% had difficulty with the Dutch language; 54% of Moroccan participants had lower vocational, primary or no schooling and 49% had difficulty with Dutch.

Participants both of Turkish and of Moroccan backgrounds using healthcare in their countries of origin differed in several respects from those not using such care. On average, they had lower educational levels, lower employment rates, lower MCS and PCS scores, more chronic diseases, more difficulty with Dutch, and were more often categorized as 'separated' in terms of cultural orientation.

Relationships between healthcare use in the country of origin and in the Netherlands

Contrary to our hypothesis, positive associations emerged between healthcare use in the country of origin and the frequent use of GP, allied health and specialist care in the Netherlands (table 2). More specifically, in both ethnic groups, after adjustment for potential confounders, both one-time and multiple use of country-of-origin

healthcare were associated with higher odds of being a frequent attender in Dutch GP care, allied healthcare and specialist medical care, in comparison with participants who did not use such cross-border care in 2010–15 (table 2, model I). The odds of frequent use of Dutch GP care, allied healthcare or specialist medical care were also higher for participants who showed multiple use of cross-border care than for those with one-time use. In both groups, additional adjustment for perceived healthcare need (indicated by SF-12 scores and number of chronic conditions) and possible explanatory variables (difficulty with Dutch language, cultural orientation and satisfaction with Dutch GP care) produced minimally higher ORs, with the 95% confidence intervals of models II and III overlapping those of model I.

The negative binomial GEE analyses yielded similar results. For both ethnic groups, cross-border healthcare use was positively associated with the use of Dutch GP care, allied healthcare or specialist medical care in the 2010–15 period (table 3).

Discussion

Our study is a further step towards exploring the relationship between the utilization of healthcare in the country of origin and in the country of residence by people from non-European backgrounds. We found no indication of avoidance of country-of-residence healthcare by those who also use healthcare in the country of origin. Instead we found a positive relationship between the two sites of care in terms of health service use. People using healthcare in the country of origin had higher odds of being

Table 3 Associations of healthcare use in the country of origin with healthcare use in the Netherlands by participants of Turkish and Moroccan origin (negative binomial GEE analysis)

Participants of Turkish origin and Moroccan origin (*N*=2563 and *N*=2757)	Model I	Model II	Model III
Healthcare use in country of origin[a]			
GP care			
Turkish	1.05 (1.04–1.07)	1.05 (1.04–1.07)	1.05 (1.04–1.07)
Moroccan	1.06 (1.04–1.08)	1.06 (1.04–1.08)	1.06 (1.04–1.08)
Allied healthcare			
Turkish	1.05 (1.02–1.09)	1.05 (1.02–1.09)	1.05 (1.02–1.08)
Moroccan	1.08 (1.02–1.14)	1.06 (1.01–1.12)	1.06 (1.01–1.12)
Specialist medical care			
Turkish	1.10 (1.08–1.13)	1.10 (1.07–1.12)	1.10 (1.08–1.12)
Moroccan	1.10 (1.07–1.14)	1.09 (1.06–1.13)	1.10 (1.06–1.13)

The reported numbers are incidence rate ratios with their corresponding 95% confidence intervals. Model I: adjusted for time, age, gender, marital status, migration generation, education level and employment status. Model II: Model I additionally adjusted for SF-12 MCS, SF-12 PCS and number of self-reported chronic conditions. Model III: Model II additionally adjusted for difficulty with Dutch language, cultural orientation and satisfaction with Dutch GP.

a: Based on reimbursed healthcare use in the 2010–15 period; 81% of the Turkish group and 74% of the Moroccan group had reimbursement data available throughout the period, others for only part of the period (1–6 years).

frequent attenders in the Dutch healthcare system. Adjustment for confounders and for indicators of perceived need for healthcare did not alter the positive association, nor did degree of difficulty with the Dutch language, differential cultural orientation or degree of satisfaction with Dutch GP care.

That was contrary to our expectations. Our hypothesis derived from previous studies that found that perceived access barriers to the health system of the country of residence were related to certain patient characteristics' (including difficulty with the second language, perceived cultural distance from the current healthcare system and low socioeconomic status) as well as to specified reasons for using healthcare in the country of origin (need for a second opinion, unfulfilled expectations of the current health system).[4,5,7,18] In our study, Dutch participants of Turkish and Moroccan background who utilized healthcare in the countries of origin were found to have lower socioeconomic status and to be more separated from the Dutch society than their counterparts who did not use healthcare in the country of origin. Given those differences in profile, one might expect them to avoid using Dutch healthcare. Yet any perceived distance to the Dutch healthcare system appeared not to be accompanied by avoidance of care in the Netherlands. The reasons why some people showed a higher level of healthcare use in both countries remain unclear. Previous qualitative studies have highlighted certain patient characteristics—such as a critical mindset, opportunism in seeking care or a strong desire for specialist expertise—as possible motivations for healthcare use in the country of origin.[6,7]

Strengths and limitations

To our knowledge, this is the first study where a large multi-ethnic cohort study was linked to healthcare reimbursement data. We had access to healthcare data from large numbers of respondents, yielding sufficient statistical power for cross-sectional analysis per ethnic group. Moreover, we had detailed self-reported data from the HELIUS study on many variables relating to healthcare need and sociodemographic characteristics.

Our study had some limitations. The Achmea Health Database did not include non-declared payments of healthcare use in the countries of origin. We presume that number to be very low, however, as Dutch insurance companies generally reimburse healthcare deemed necessary in foreign countries (via the third-party insurer EuroCross).

Another possible limitation is that healthcare use in the country of origin and in the Netherlands was assessed throughout the 2010–15 period, whereas the healthcare needs of participants (indicated by MCS and PCS scores and numbers of chronic conditions) were assessed only once and might have fluctuated over time. Although the inclusion of these variables had little impact in our analyses, their actual contribution could be more substantial.

Generalisability and further research

Our results may be relevant for high-income countries with large migrant populations of comparable backgrounds. Our results show that some immigrants with backgrounds in non-European countries have high healthcare consumption in both countries and that there are no indications for avoidance of healthcare in the country of residence. Since the variables included in this study could not explain the use of cross-border care, other issues such as beliefs about health and sickness or about when to seek healthcare should be explored as additional patient characteristics that might explain our findings.

In clinical practice, GPs could play an important role in minimizing the level of cross-border healthcare use. If they have frequent attenders in their practice who have backgrounds in other countries, they might broach the subject of whether the patients also utilize healthcare in the country of origin, explaining the risk of iatrogenic events and other health detriments. An important focus for further research could be on the scale and causes of iatrogenic events arising from healthcare use in migrants' countries of origin.

Conclusion

People with Turkish and Moroccan ethnic backgrounds living in the Netherlands frequent make additional use of healthcare in their countries of origin. We found no indication that this is attributable to avoidance of healthcare use in the country of residence by immigrants of non-European background. We instead found a positive correlation: higher healthcare use in the country of origin was associated with higher use in the country of residence.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Key points

- Higher healthcare use in the country of origin is associated with higher use in the country of residence among people of non-European background in the Netherlands.
- We found no evidence of avoidance of healthcare use in the country of residence by people with non-European backgrounds who use healthcare in their countries of origin.
- A knowledge gap exists as to whether healthcare use in countries of origin is associated with iatrogenic events (scale and causes).

References

1   Migration and Migrant Population. Statistical Office of the European Union, Luxembourg. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Migration_and_migrant_population_statistics#Migrant_population:_almost_22_million_non-EU_citizens_living_in_the_EU (23 January 2019, date last accessed).

2   Immigration in the EU. Statistical Office of the European Union, Luxembourg. Available at: https://ec.europa.eu/home-affairs/sites/homeaffairs/files/e-library/docs/infographics/immigration/migration-in-eu-infographic_en.pdf (23 January 2019, date last accessed).

3   Villa-Torres L, Gonzalez-Vazquez T, Fleming PJ, et al. Transnationalism and health: a systematic literature review on the use of transnationalism in the study of the health practices and of migrants. *Soc Sci Med* 2017;183:70–9.

4   Nielsen SS, Yazici S, Petersen SG, et al. Use of cross-border healthcare services among ethnic Danes, Turkish immigrants and Turkish descendants in Denmark: a combined survey and registry study. *BMC Health Serv Res* 2012;12:390.

5   Sekercan A, Lamkaddem M, Snijder MB, et al. Healthcare consumption by ethnic minority people in their country of origin. *Eur J Public Health* 2015;25:384–90.

6   Lokdam N, Kristiansen M, Handlos LN, Norredam M. Use of healthcare services in the region of origin among patients with an immigrant background in Denmark: a qualitative study of the motives. *BMC Health Serv Res* 2016;16:99.

7   Sekercan A, Woudstra AJ, Peters RJG, et al. citizens of Turkish origin who utilise healthcare services in Turkey: a qualitative study on motives and contextual factors. *BMC Health Serv Res* 2018;18:289.

8   Statistics Netherlands. StatLine: Sociodemographic Characteristic of the Dutch Population. Available at: https://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=37296NED&D1=31, 34&D2=0, 10, 20, 30, 40, 50,(l-1)-l&VW=T (23 January 2019, date last accessed).

9   Stronks K, Snijder MB, Peters RJ, et al. Unravelling the impact of ethnicity on health in Europe: the HELIUS study. *BMC Public Health* 2013;13:402.

10 Snijder MB, Galenkamp H, Prins M, et al. Cohort profile: the Healthy Life in an Urban Setting (HELIUS) study in Amsterdam, The Netherlands. *BMJ Open* 2017;7:e017873.

11 Stronks K, Kulu-Glasgow I, Agyemang C. The utility of 'country of birth' for the classification of ethnic groups in health research: the Dutch experience. *Ethn Health* 2009;14:255–69.

12 Smits FT, Brouwer HJ, Zwinderman AH, et al. Morbidity and doctor characteristics only partly explain the substantial healthcare expenditures of frequent attenders: a record linkage study between patient data and reimbursements data. *BMC Fam Pract* 2013;14:138.

13 Mols F, Pelle AJ, Kupper N. Normative data of the SF-12 health survey with validation using postmyocardial infarction patients in the Dutch population. *Qual Life Res* 2009;18:403–14.

14 Galenkamp H, Stronks K, Mokkink LB, Derks EM. Measurement invariance of the SF-12 among different demographic groups: the HELIUS study. *PLoS One* 2018;13:e0203483.

15 GGD Amsterdam. Amsterdamse Gezondheidsmonitor 2016. Available at: http://www.ggd.amsterdam.nl/publish/pages/840987/gezondheid_in_beeld_factsheet_amsterdam.pdf (23 January 2019, date last accessed).

16 Stevens G, Pels TVM, Vollebergh WAM, Crijnen A. Patterns of psychological acculturation in adult and adolescent Moroccan immigrants living in the Netherlands. *J Cross-Cult Psychol* 2004;35:689–704.

17 Berry JW. Immigration, acculturation, and adaptation. *Appl Psychol* 1997;46:5–34.

18 Wang L, Kwak MJ. Immigration, barriers to healthcare and transnational ties: a case study of South Korean immigrants in Toronto, Canada. *Soc Sci Med* 2015;133:340–8.