Older immigrants' use of public home care and residential care

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Abstract The purpose of this paper is to analyse the extent to which length of residence in the country and country of origin are of importance to older immigrants' use of long-term care services compared to native older people. The analyses were conducted on a population of over 65s living in the Municipality of Copenhagen on 1st Jan 2007. Information was drawn from the administrative registers of the Municipality of Copenhagen on the population's use in 2007 of home care and of residential care in a nursing home. These data were combined by Statistics Denmark with demographic data, socio-economic data and data on the use of health services. It was found that older immigrants are less likely than ethnic Danes to use municipal long-term care services when other predisposing, enabling and need factors are controlled for. The difference is greatest between ethnic Danes and immigrants from non-western countries who have only lived in Denmark for a few years. The difference decreases the longer the immigrant has lived in the country. The findings may be explained, at least in part, by poorer language skills and poorer knowledge of the Danish welfare system among older immigrants and the fact that they are more likely to be cared for by relatives than ethnic Danes are. However, in the course of time language skills improve and knowledge of the system increases and life style with respect to care may approach that of older Danes.

Keywords Use of home care · Residential care · Older immigrants · Native born older people · Length of residence · Ethnic differences

Introduction

As in other Western European countries, older immigrants to Denmark from especially non-western countries will, in the years to come, represent a growing share of the ageing population. In Denmark the number of immigrants over 65 from non-western countries is expected to increase from some 15,000 in 2011 to about 55,000 in 2030, or from 1.6 to 4.1 % of the older population (Statistics Denmark www.dst.dk). In the urban areas this development will be even stronger.

Although people from non-western countries will still constitute a minor part of the older population in 2030, caring for this group may involve special challenges for the public sector. Older immigrants may not use public long-term care services to the same extent as ethnic Danes. If a difference reflects a difference in needs, it is unproblematic. If, however, a difference is caused by differences in traditions with respect to informal care and/or access to services there may be a challenge for the public sector in securing immigrants a proper care comparable to the native population.

Previous research shows mixed results with respect to immigrants' use of health services and long-term care services compared to the native population. Some studies find that better health among immigrants than the native population leads to less use of the health service (e.g. Ali et al. 2004; Mohanty et al. 2005; Goldman et al. 2006). Other studies find that immigrants make less use of the health service or long-term care services (Eriksson 1996; Moon

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et al. 1998; ten Have and Bijl 1999; Albertsson et al. 2004; Denktas 2011) and differences among groups of immigrants in the use of the health service or long-term care services that cannot be explained by health differences (Schellingerhout 2004; Gerritsen et al. 2006; Denktas 2011). On the other hand, there are studies which find that specific groups of immigrants make as much or more use of the general health service than the native population (Hargreaves et al. 2006; Solé-Auró et al. 2012), but are less likely to use specialised health services (Stronks et al. 2001).

Statistics from the Municipality of Copenhagen point to the fact that older immigrants are less likely to have a home help than older Danes and are less likely to live in a nursing home (Fatum and Madsen 2007).

The extent to which immigrants to a country differ in their use of long-term care services from the native population may depend on the socio-economic characteristics of the immigrant population, as there is a clear connection between socio-economic factors on the one hand and health and functional ability on the other (e.g. Reijneveld 1998; Alwin and Wray 2005). Municipal long-term care services are primarily allotted on the basis of an assessment of health and functional impairments (e.g. Stuart and Hansen 2006; Larsson et al. 2006) and the use of these services is therefore connected to socio-economic factors. Research points to the fact that social status has a stronger effect than country of origin on self-rated and objective health (Albertsson et al. 2004).

Other researchers have pointed to other factors than socio-economic ones as an explanation for reduced use of long-term care services by immigrants. The explanation might be a lack of information regarding the various services available, bad communication between public servants and immigrants (language problems), the fact that certain needs are taken care of by relatives and the possibility that case workers may discriminate between immigrants and the native born (Albertsson et al. 2004; Schellingerhout 2004). The observation that immigrants are less likely to be found living in nursing homes, etc. may be due to the fact that it is not possible to fulfil their desire for staff familiar with their language and culture, but cultural habits may also play a role, and relatives assume the obligation to provide the necessary care (Albertsson et al. 2004).

Studies of immigrants' use of long-term care services seem to be limited in number, and it cannot be taken for granted that tendencies in the use of health-care services in general also apply to the use of long-term care services in particular.

A previous Danish study (Fatum and Madsen 2007) shows less use of long-term care services by older non-western immigrants than by older Danes. This study does not control for age differences, socio-economic differences or differences in need but the findings indicate that

language difficulties, poor knowledge of the public welfare system and cultural differences may be involved. Length of residence in the country may be an indicator of language skills, knowledge of the Danish system and adoption of a Danish life style with respect to providing informal care. The life style of non-western immigrants may differ from the life style of western immigrants.

The purpose of this article is to analyse the extent to which older immigrants' length of residence in Denmark and their country of origin are of importance to their use of long-term care services compared to native Danes when other factors are taken into consideration.

The analysis is theoretically based on the behavioural model of health service use (Andersen and Newman 1973; Andersen 1995; Andersen and Davidson 2001). This model was developed to explain the individual's use of short-term health-care services, but can be considered valid for long-term care as well (e.g. Calsyn and Winter 2000; Larsson et al. 2006). The model assumes that the use of long-term care services is determined by three types of factors: predisposing factors (e.g. gender, age, education and ethnicity), enabling factors (e.g. income and informal care options) and need factors (e.g. health indicators). Furthermore, use is determined by the care provision system and the external environment which in this context are assumed constant.

On basis of this a simple model for the analyses has been formed and the variables of the model are shown in Fig. 1.

In the analytical model country of origin (ethnicity) is considered a predisposing factor indicating cultural differences with respect to the use of informal care and differences with respect to access to long-term care services. The length of residence is considered an enabling factor as the effect of country of origin (ethnicity) is expected to be reduced with increased length of residence.

In interpreting the result of this study it is worth noting that Denmark allows equal access to public long-term care services for all legal residents. Furthermore, there is no user payment for long-term care services. Therefore,

Fig. 1 Model for the statistical analyses

formal rules do not prevent immigrants from gaining access to public long-term care services compared to native Danes.

This study covers the use of residential care facilities and home-care services such as assistance with domestic chores like cleaning, laundry and shopping as well as personal care like bathing, transfers and dressing or undressing.

Methods

The analyses were conducted using administrative data about the provision of long-term care services by the Municipality of Copenhagen. The following types of analyses have been carried out.

To what extent do immigrants, compared with ethnic Danes

- a. receive any long-term care at all, i.e. assistance with domestic chores, personal care in their own home or care in a nursing home,
- b. receive municipal assistance with domestic chores,
- c. receive municipal assistance with personal care,
- d. live in a nursing home?

The population comprises over 65s living in the Municipality of Copenhagen on 1st Jan 2007. The population's use of assistance with domestic chores, personal care and residential care during 2007 is analysed. Data from the Municipality of Copenhagen was combined by Statistics Denmark with demographic data, education, occupation before retirement, income, public health insurance services and bed days in hospital. These data were made available to the author in an anonymous form.

Dependent variables

The dependent variables in the analyses are described below.

Residential care consists of all types of housing providing long-term round-the-clock care. The variable indicates if a person who was a resident of Copenhagen on 1st Jan 2007 was living in a residential care facility during (part of) 2007.

Personal care comprises assistance with personal care in 2007. The variable indicates if a person received personal care during 2007.

Assistance with domestic chores means assistance with such tasks as cleaning, laundry and shopping. The variable indicates if a person was receiving such assistance during 2007.

Home care indicates if a person was receiving personal care and/or assistance with domestic chores during 2007.

Long-term care in 2007 indicates whether a person living in Copenhagen on the 1st Jan 2007 either received assistance with domestic chores, personal care or was living in a residential care facility at any time during the year.

Independent variables

In the analyses country of origin and length of residence are combined and placed as a predisposing factor. The variable divides the population into five groups: (1) ethnic Danes, (2) immigrants from a *western country* living in Denmark for less than 10 years, (3) immigrants from a *western country* living in Denmark for more than 10 years, (4) immigrants from a *non-western country* living in Denmark for less than 10 years and (5) immigrants from a *non-western country* living in Denmark for more than 10 years. The threshold of 10 years is arbitrary. *Because of unknown date of immigration, people who have immigrated before 1978 are not included in the analyses.* Western countries are defined as the 27 EU countries, Iceland, Norway, Andorra, Liechtenstein, Monaco, San Marino, Switzerland, the Vatican City, Canada, USA, Australia and New Zealand. The dominant countries among immigrants from non-western countries are the former republic of Yugoslavia, Turkey, Pakistan, Iraq, Iran and Morocco. Immigrants from western countries are first of all from the neighbouring countries Norway, Sweden, Germany, Poland and Great Britain.

In the analyses we control for a number of other factors that may be of importance for procuring assistance. They relate to demography and socio-economic status (predisposing), income and access to informal care (enabling) and the use of health services (need). They are described in the 'Appendix' section. The variables describing socio-economic status are: occupation at the age of 59 and highest completed education. Income is average disposable income per person in 2004 and 2005. The use of health-care services in the period 2000–2005 is considered an imperfect but applicable indicator of health. It would have been relevant to include more up-to-date data on the use of health-care services, but they were not available at the time. In the analyses of residential care a variable for marital status is used, while a variable live alone/does not live alone is used in the analyses of home-care services. It would not make sense to use the variable live alone/does not live alone in relation to residential care as nearly all in a residential care facility live alone. On the other hand, people living in a residential care facility may be married to a person living outside the residential facility, and this variable expresses whether a person has access to informal care from a spouse.

Statistical method

Differences between immigrants and ethnic Danes in the use of long-term care services were analysed using logistic regression. The analytical strategy was in the first step to include all theoretically relevant variables in the model and then progressively eliminate the most insignificant variables in the following steps. However, at a significance level of 5 %, all relevant variables turned out to have a significant correlation with the dependent variable and therefore only one step was conducted.

Information on education is not registered for persons in the older age groups. Therefore, we conducted two types of analysis: one, consisting of all over 65s without the variable on education, and one, consisting of the age group 65–84 only, which includes the variable on education to test whether the inclusion of this variable produced a different result.

Results

The percentage of Copenhagen residents over 65 who were living in nursing homes, receiving assistance with domestic chores and/or receiving personal care in 2007 is shown in Table 1.

The table shows that 40 % of ethnic Danes were either living in municipal residential care facilities or were receiving assistance with domestic chores or personal care from the Municipality of Copenhagen during 2007. This proportion is considerably higher than that for older immigrants. If we consider immigrants only, the proportion receiving domestic assistance or personal care was highest among immigrants from a western country who came to Denmark more than 10 years ago.

Only a small share of the population was living in a residential care facility during 2007, but here too the share was bigger among ethnic Danes than among immigrants. Residential care seems to have been very rare among older immigrants.

35 % of older ethnic Danes received assistance with domestic chores or personal care during 2007. Among older immigrants the share is considerably lower and is lowest of all among those who came to Denmark less than 10 years ago. The same pattern is found for assistance with domestic chores and for personal care with the highest percentage of immigrants receiving care being those who came to Denmark more than 10 years ago. Among ethnic Danes the percentage receiving assistance with domestic chores is higher than the percentage receiving personal care. This, however, is not the case among immigrants.

In the following section we analyse the extent to which the differences are explained by length of residence in Denmark and country of origin when other predisposing, enabling and need factors are taken into account.

Use of at least one type of municipal care

The first analysis focuses on whether there is a difference among ethnic groups with respect to having received any aid at all during 2007, whether in the form of residential care, assistance with domestic chores or personal care. In Table 2 we present results from the logistic regression.

The analyses demonstrate a number of expected correlations which are not commented on further, e.g. married people use the system less than the unmarried, use increases with age, and high socio-economic status is connected with lower use than low socio-economic status.

Considering both the model for the over 65s as a whole and the model for the age group 65–84, older immigrants

Table 1 Percentage of people aged 65+ in the Municipality of Copenhagen on 1st Jan 2007 receiving long-term care services during 2007

	Ethnic Danes	Immigrants from a western country less than 10 years ago	Immigrants from a western country more than 10 years ago	Immigrants from a non-western country less than 10 years ago	Immigrants from a non-western country more than 10 years ago	All
Residential care, help with domestic chores <i>or</i> personal care	40	14	27	14	18	39
Residential care	7	2	4	1	1	6
Help with domestic chores <i>or</i> personal care	35	12	24	13	17	34
Help with domestic chores	30	7	19	6	10	30
Personal care	24	9	17	10	13	23
N=	50,008	146	692	336	1,487	52,669

Calculated according to country of origin and length of residence (excluding unknown year of immigration)

$p < 0.001$ for all types of care services

Table 2 Logistic regression on the use of *long-term care services* (residential care, personal care or help with domestic chores) during 2007

	65+ years of age		65–84 years of age	
	Coefficient	SE	Coefficient	SE
Intercept	0.283***	0.056	0.261***	0.060
Predisposing factors				
Man	−0.154***	0.027	−0.133***	0.029
Woman	Reference			
Aged 65–69	−2.257***	0.040	−2.171***	0.042
Aged 70–74	−1.452***	0.034	−1.363***	0.036
Aged 75–79	−0.738***	0.032	−0.643***	0.034
Aged 80+	Reference			
Ethnic Dane	Reference			
Immigrated from a western country <10 years in Denmark	−0.689	0.369	−0.384	0.493
Immigrated from a western country >10 years in Denmark	−0.316**	0.107	−0.169	0.124
Immigrated from a non-western country <10 years in Denmark	−1.434***	0.208	−0.646**	0.240
Immigrated from a non-western country >10 years in Denmark	−0.792***	0.084	−0.526***	0.109
Blue-collar worker	Reference			
White-collar worker	0.006	0.039	0.054	0.041
Manager or superior servant	−0.202***	0.046	−0.077	0.052
Self-employed	−0.172*	0.069	−0.149*	0.073
Unemployed	0.143**	0.048	0.169***	0.049
Outside the labour force	0.598***	0.035	0.603***	0.036
Occupation unknown	0.647***	0.041	−0.229	0.128
Primary school only	Reference			
Skilled worker			−0.121***	0.030
Secondary school			−0.393***	0.116
Short or medium-cycle higher education			−0.230***	0.053
Long-cycle higher education			−0.251**	0.091
Education unknown			−0.048	0.086
Enabling factors				
Widow/widower	0.044	0.039	0.004	0.044
Divorced	−0.013	0.041	−0.028	0.044
Married	−0.650***	0.042	−0.673***	0.047
Unmarried	Reference			
Average income 2004–2005 (10,000 DKK)	−0.022***	0.002	−0.025***	0.002
Need factors				
Number of bed days 2000–2005	0.143***	0.004	0.167***	0.005
Use of services from health-care insurance 2000–2005	0.001***	0.00007	0.001***	0.00008
N=	46,827		37,109	
Pseudo R ²	0.28		0.23	

People aged 65+ and 65–84 in the Municipality of Copenhagen

Significance level: * 5 %; ** 1 %; *** 0.1 %

receive long-term care less frequent than ethnic Danes. The estimated difference with respect to immigrants from western countries, however, is uncertain. Furthermore, there is a difference between immigrants from western and non-western countries, and the frequency of residential care or care in their own home is lower among immigrants from non-western countries when other factors are

controlled for. The frequency is lowest among older immigrants from non-western countries who have lived in Denmark for less than 10 years.

Based on the model for the over 65s as a whole we have calculated the probability of receiving municipal long-term care in 2007. The calculation is made for a person with the following characteristics: female, aged 75–79, widow, left

school at the minimum age, blue-collar worker at the age of 59, income average, health insurance services average and bed days average. An ethnic Dane with these characteristics had a probability of 0.38 of receiving long-term care in 2007. The probability for an immigrant from a western country who had lived in Denmark for more than 10 years was just slightly lower, namely 0.31. For immigrants from a non-western country the probability is considerably lower. For those who have lived in Denmark for less than 10 years, it is 0.13, and for those who have lived in Denmark for more than 10 years, 0.22.

Residential care

In the subsequent paragraphs we consider each type of long-term care service in order to analyse whether the pattern of use varies between residential care, assistance with domestic chores and personal care in one's own home. The results of the analyses for residential care appear in Table 3.

The number of older immigrants from as well a non-western country as 65- to 84-year-olds from western countries who had been in Denmark for less than 10 years and were living in residential care facilities in 2007 is too low to estimate a probability.

Immigrants who had been in Denmark for over 10 years in 2007 were less likely than ethnic Danes to live in a residential care facility and the frequency was lowest among non-western immigrants. This was also the case in the model for 65- to 84-year-olds where educational background was included.

The probability of living in a residential care facility during 2007 was calculated for a person with the same characteristics as in the above paragraph. For an ethnic Dane it was 0.03. The probability was 0.02 for a western immigrant who had been living in Denmark for more than 10 years and 0.007 for a non-western immigrant living in Denmark for more than 10 years.

Home care

In this paragraph we first analyse the frequency of receiving home-care service in general, and then break it down into assistance with domestic chores or personal care. In Denmark people needing personal care usually also require assistance with domestic chores, while many require assistance with domestic chores but not personal care. The result of the analyses is presented in Table 4.

The tendency is the same as in the previous analyses; i.e. older immigrants received assistance with domestic chores and/or personal care at home less frequently than ethnic Danes. The lowest frequency is among non-western immigrants and immigrants living in Denmark for less than

10 years. The tendency is the same in the analyses for the population of the over 65s and 65- to 84-year-olds.

The probability of receiving home care from the municipality for our 'standard person' is 0.38 if she is an ethnic Dane. If she came from a western country less than 10 years ago the probability is 0.3 but 0.33 if she arrived more than 10 years ago. If she came to Denmark from a non-western country less than 10 years ago the probability is 0.21 and 0.28 if she arrived more than 10 years ago.

We expected that there would be a difference in the need for municipal assistance with domestic chores and personal care among immigrants as we expected domestic chores to be more likely to be performed by the family. Therefore, separate analyses of the need for assistance with domestic chores and personal care were conducted and the results appear in Table 5.

With respect to personal care at home, western immigrants received municipal assistance as frequently as ethnic Danes. Non-western immigrants received assistance with personal care less frequently, and the frequency was lowest among those who had lived in Denmark for less than 10 years. The calculated probability of receiving personal care for our 'standard person' is 0.3 for ethnic Danes. The probability is 0.12 for non-western immigrants living in Denmark for less than 10 years, and 0.17 for those living in Denmark for more than 10 years.

Immigrants receive assistance with domestic chores less frequently than ethnic Danes. The frequency is least among those who have lived in Denmark for less than 10 years. The difference between immigrants and ethnic Danes with respect to the frequency of assistance is bigger for domestic chores than personal care. Immigrants receive assistance with domestic chores less frequently. The probability for our 'standard person' was the following: (a) ethnic Dane 0.36, (b) western immigrant in Denmark less than 10 years 0.16, (c) western immigrant in Denmark more than 10 years 0.20, (d) non-western immigrant in Denmark less than 10 years 0.10 and (e) non-western immigrant in Denmark more than 10 years 0.18.

Among older immigrants from non-western countries the probability of assistance with domestic chores is not higher than the probability of receiving personal care. This is the opposite of the case for ethnic Danes.

Discussion

The main purpose of this paper has been to analyse the extent to which length of residence in the country and country of origin are of importance to older immigrants' use of long-term care services compared to native older people. The behavioural model of health service use has been the basis for the statistical analyses in the article and, as the

Table 3 Logistic regression on the use of *residential care* during 2007

	65+ years of age		65–84 years of age	
	Coefficient	SE	Coefficient	SE
Intercept	−1.711***	0.103	−0.826	0.134
Predisposing factors				
Man	0.070	0.048	0.285***	0.064
Woman	Reference			
Aged 65–69	−1.607***	0.090	−1.573***	0.095
Aged 70–74	−1.165***	0.077	−1.113***	0.082
Aged 75–79	−0.486***	0.063	−0.416***	0.067
Aged 80+	Reference			
Ethnic Dane	Reference			
Immigrated from a western country <10 years in Denmark	−1.692	1.023	–	–
Immigrated from a western country >10 years in Denmark	−0.556*	0.226	−0.505	0.279
Immigrated from a non-western country <10 years in Denmark	–	–	–	–
Immigrated from a non-western country >10 years in Denmark	−1.542***	0.232	−1.428***	0.315
Blue-collar worker	Reference			
White-collar worker	−0.052	0.091	0.070	0.099
Manager or superior servant	0.050	0.109	0.010	0.128
Self-employed	−0.218	0.173	−0.186	0.184
Unemployed	0.139	0.112	0.195	0.116
Outside the labour force	0.741***	0.072	0.814***	0.078
Occupation unknown	1.139***	0.071	0.092	0.317
Primary school only	Reference			
Skilled worker			−0.1652*	0.066
Secondary school			−0.221	0.280
Short or medium-cycle higher education			−0.109	0.128
Long-cycle higher education			0.149	0.224
Education unknown			0.140	0.180
Enabling factors				
Widow/widower	−0.244***	0.062	−0.348***	0.087
Divorced	−0.286***	0.070	−0.359***	0.088
Married	−0.503***	0.080	−0.523***	0.101
Unmarried	Reference			
Average income 2004–2005 (10,000 DKK)	−0.063***	0.005	−0.068***	0.006
Need factors				
Use of services from health-care insurance 2000–2005	0.0002	0.0001	0.0008***	0.0001
Number of bed days 2000–2005	0.077***	0.005	0.068***	0.006
N=	46,827		37,109	
Pseudo R ²	0.08		0.04	

People in the Municipality of Copenhagen aged 65+ and 65–84

Significance level: * 5 %; ** 1 %; *** 0.1 %

model suggests, correlation between predisposing, enabling and need factors have been found. These factors have been included in the analyses to control for other differences in the population than immigrants' characteristics.

The overall tendency in the analyses is that older immigrants make less frequent use of municipal residential care facilities and home-care services than ethnic Danes.

The frequency is less with respect to making any use at all of these services and also in respect of each of the service types: residential care, help with domestic chores and personal care at home. If we consider home-care services only, immigrants from non-western countries are compared to ethnic Danes less likely to receive assistance with domestic tasks than to receive personal care in their own

Table 4 Logistic regression on the use of *home care* during 2007

	65+ years of age		65–84 years of age	
	Coefficient	SE	Coefficient	SE
Intercept	−0.592***	0.051	−0.661***	0.062
Predisposing factors				
Man	−0.130***	0.025	−0.167***	0.029
Woman	Reference			
Aged 65–69	−2.112***	0.038	−2.022***	0.041
Aged 70–74	−1.283***	0.033	−1.202***	0.035
Aged 75–79	−0.634***	0.031	−0.557***	0.034
Aged 80+	Reference			
Ethnic Dane	Reference			
Immigrated from a western country <10 years in Denmark	−0.360	0.363	−0.223	0.485
Immigrated from a western country >10 years in Denmark	−0.241*	0.105	−0.108	0.124
Immigrated from a non-western country <10 years in Denmark	−0.853***	0.202	−0.383	0.236
Immigrated from a non-western country >10 years in Denmark	−0.527***	0.081	−0.355***	0.108
Blue-collar worker	Reference			
White-collar worker	0.004	0.039	0.029	0.041
Manager or superior servant	−0.276***	0.045	−0.111*	0.052
Self-employed	−0.210**	0.068	−0.177*	0.072
Unemployed	0.108*	0.048	0.131**	0.049
Outside the labour force	0.458***	0.035	0.445***	0.036
Occupation unknown	0.223***	0.038	−0.302*	0.128
Primary school only	Reference			
Skilled worker			−0.099***	0.030
Secondary school			−0.450***	0.118
Short or medium-cycle higher education			−0.253***	0.053
Long-cycle higher education			−0.357***	0.091
Education unknown			−0.089	0.087
Enabling factors				
Live alone	0.573***	0.030	0.633***	0.035
Does not live alone	Reference			
Average income 2004–2005 (10,000 DKK)	−0.010***	0.002	−0.014***	0.002
Need factors				
Use of services from health-care insurance 2000–2005	0.001***	0.00007	0.001***	0.00008
Number of bed days 2000–2005	0.080***	0.004	0.122***	0.004
N=	46,842		37,124	
Pseudo R^2	0.2		0.18	

People in the Municipality of Copenhagen aged 65+ and 65–84

Significance level: * 5 %; ** 1 %; *** 0.1 %

home. A similar tendency has been observed in a Norwegian study (Nergård 2008). This could point to the fact that assistance with domestic chores among older immigrants is more likely to be taken care of, e.g. through informal care.

Furthermore, immigrants from non-western countries less frequently receive municipal help or care than western immigrants. This holds true for residential care and assistance with domestic chores as well as personal care at home.

Finally, the analyses have shown that older immigrants who have lived in Denmark more than 10 years more frequently avail themselves of municipal long-term care services than immigrants who have lived in the country for a shorter period. This is most distinct among immigrants from non-western countries.

There may be some limitations to the study. The use of the health insurance service and bed days in hospital in 2000–2005 have been used as an indicator of the need for

Table 5 Logistic regression of the use of *personal care* and *help with domestic chores* during 2007

	Personal care		Domestic chores	
	Coefficient	SE	Coefficient	SE
Intercept	−1.153***	0.056	−1.128***	0.057
Predisposing factors				
Man	0.028	0.027	−0.254***	0.027
Woman	Reference			
Aged 65–69	−1.843***	0.044	−2.148***	0.042
Aged 70–74	−1.150***	0.037	−1.243***	0.035
Aged 75–79	−0.602***	0.034	−0.589***	0.032
Aged 80+	Reference			
Ethnic Dane	Reference			
Immigrated from a western country <10 years in Denmark	−0.346	0.389	−1.110*	0.468
Immigrated from a western country >10 years in Denmark	−0.171	0.116	−0.342**	0.112
Immigrated from a non-western country <10 years in Denmark	−0.756***	0.223	−1.617***	0.278
Immigrated from a non-western country >10 years in Denmark	−0.326***	0.089	−0.944***	0.098
Blue-collar worker	Reference			
White-collar worker	−0.122**	0.044	0.082*	0.041
Manager or superior servant	−0.326	0.052	−0.226***	0.049
Self-employed	−0.186	0.076	−0.187*	0.074
Unemployed	0.080	0.054	0.123*	0.052
Outside the labour force	0.388***	0.038	0.479***	0.037*
Occupation unknown	0.413***	0.040	0.259***	0.040
Enabling factors				
Live alone	0.333***	0.033	1.017***	0.034
Does not live alone	Reference			
Average income 2004–2005 (10,000 DKK)	−0.008***	0.002	−0.012***	0.002
Need factors				
Use of services from health-care insurance 2000–2005	0.0009***	0.00007	0.001***	0.00007
Number of bed days 2000–2005	0.099***	0.004	0.069***	0.004
N=	46,842		46,842	
Pseudo R^2	0.14		0.21	

People in the Municipality of Copenhagen aged 65+

Significance level: * 5 %; ** 1 %; *** 0.1 %

assistance and care in 2007. Newer data were not accessible at the time of the analyses. These are not perfect indicators, as the health of the population may have changed during the next 3 years. This, however, is only a problem if health has changed to a different degree within the cohort of ethnic Danes and that of immigrants. We do not expect this to be the case when differences with respect to other predisposing and enabling factors are taken into account.

We know that the use of long-term care is very much dependent on functional impairment (e.g. Larsson et al. 2006), and the number of bed days in hospital and use of health insurance services may not be perfect indicators of one's ability to perform the activities of daily living. Functional impairment is not connected to hospital admissions

alone, and the use of health insurance services is not just connected to functional impairment. This could explain the low R^2 of the models, but again, it is only a problem for the results if they are poorer indicators of, for example, the ability of immigrants to carry out the activities of daily living compared to ethnic Danes. This is the case if the use of hospital beds and health insurance services *ceteris paribus* is lower among immigrants than among ethnic Danes and correlate with the length of residence in the country. In this case we may underestimate the actual differences in the use of long-term care services by ethnic Danes and immigrants with comparable conditions, and the difference with respect to the length of residence may be biased.

The analyses do not include immigrants who have immigrated to Denmark before 1978. This probably means

that the difference between immigrants having resided in the country for shorter or longer than 10 years is underestimated in the analyses.

Earlier studies on the use of health services by older immigrants are not unambiguous, but the general tendency is that immigrants' use of health services seems to depend on the socio-economic composition of the immigrant group compared to the native population. Poorer social-economic conditions among immigrants than among the native population may lead to greater use of health-related services. This is not the case in this study and we find that the use of long-term care services is lower among immigrants than ethnic Danes both when controlling for socio-economic differences and when not.

The analyses do not provide any explanation to immigrants' less frequent use of municipal long-term care services compared to ethnic Danes'. The difference, however, may be due to two types of conditions: lack of awareness of the availability of municipal assistance and more help and care from relatives.

Communication with the welfare system may be a barrier because of language difficulties (Egeblad 2005; Rademacher et al. 2009; Denktas 2011; Hurley et al. 2012). A qualitative interview study of 29 immigrants in Copenhagen and 3 of their relatives (Dupont and Fatum 2007) concluded that older immigrants and their relatives have limited knowledge of the availability of assistance from municipal elder care services. They know that residential care and home care are available, but they do not know what the services consist of and how to obtain access to them.

We can observe that the propensity to receive municipal long-term care services depends on the length of residence in Denmark. The longer the period of residence, the more immigrants' usage resembles that of ethnic Danes. A similar tendency has been found in previous studies (Leclerc et al. 1994; McDonald and Kennedy 2004). The explanation could be that the longer you have resided in a country the better is your knowledge of the welfare system and the better you are at communicating with public servants.

It is a question whether the length of residence in Denmark in reality is an indicator of different countries of origin as immigration from different countries has peaked at different times. This leads to the question whether the findings only hold for the period around 2007 and the composition of older immigrants at that time and not for a possible different composition in later years. A more specified variable on country of origin has not been introduced in the analyses for two reasons. A more specified variable on country of origin would have produced cells with only a few observations and made estimation impossible. More important, however, we did not expect that a more specified variable on country of origin would produce

significantly different results. The Danish language and the Danish welfare system will be alien to immigrants from any non-western country. One important factor could be whether the older immigrant has lived with a Danish partner or not. This may vary between western and non-western immigrants, but we do not believe that this varies with the length of residence.

The difference between immigrants' and ethnic Danes' use of long-term care services is particularly big with respect to assistance with domestic chores. The explanation could be that informal care plays a greater role among immigrants than among ethnic Danes, especially with respect to help with domestic chores. Immigrants from non-western countries may bring with them a tradition that family members take care of each other in case of a need for help. This, however, changes with time and as a consequence of many years of residence in Denmark some older immigrants and their family may have adopted a Danish lifestyle and habits. This implies that generations live apart from each other, that women are on the labour market and the moral obligation to provide help to family members is becoming more similar to the attitudes among the native Danish population. This may lead to an increased demand for publicly provided care. Similar observations are reported among older Greek immigrants in an Australian context (Hurley et al. 2012).

Dupont and Fatum (2007) report that older immigrants in Denmark are beginning to be aware that it will be difficult for their children to take care of them if they need help and care in old age. The children of older immigrants from non-western countries are more likely to be on the labour market and adopting a western lifestyle in a dwelling of their own away from their parents. However, even though relatives have less time to help, they still want to take part in providing care, possibly in collaboration with the municipal care services.

We find a difference in the use of municipal long-term care service between older immigrants from western countries and those from non-western countries. This may be explained by a difference in lifestyle. On the other hand, we cannot exclude the possibility that western immigrants mainly from the neighbouring countries have a better background for understanding the Danish welfare system than immigrants from non-western countries.

Conclusion

The conclusion of this study is that older immigrants are less likely than native older people to receive public long-term care when differences in other predisposing, enabling and need factors are controlled for. The difference is biggest between ethnic Danes and immigrants from non-western

countries who have lived in Denmark for only a few years. The difference decreases the longer an immigrant has lived in the country. A possible explanation of the differences may be poorer knowledge of the Danish welfare system among immigrants and that older immigrants are cared for by relatives to a higher extent than ethnic Danes. Older immigrants' use of long-term care services increases with the length of residence in the country. Therefore, in the future we may expect that the use of municipal long-term care services among immigrants who have lived in Denmark for many years will be close to the level of ethnic Danes.

The results of the analyses in this article may apply not only to the Danish system but also to systems in general where access to public long-term care is not based on rights earned through an insurance system. If one accept that lack

of knowledge of a country's welfare system as well as linguistic difficulties are barriers to older immigrants in general, the length of residents may in general influence older immigrants' use of long-term care services. If the observed difference between immigrants and ethnic Danes is due to differences in lifestyle, the same difference may not apply in mid and southern European countries. A tradition among immigrants from non-western countries with respect to being cared for by family members is divergent from the mainstream in the Nordic countries but not to the same extent in mid and southern European countries (Lowenstein et al. 2004).

Appendix: Description of variables

Variable	Explanation	Mean	SD	Min	Max
Dependent variables					
Received personal care or help with domestic chores 2007	=1 Received personal care or help with domestic chores	0.34		–	–
Did not receive personal care or help with domestic chores 2007	=1 Did not receive personal care or help with domestic chores	0.66		–	–
Received help with domestic chores 2007	=1 Received help with domestic chores	0.29		–	–
Did not receive help with domestic chores 2007	=1 Did not receive help with domestic chores	0.71		–	–
Received personal care 2007	=1 Received personal care	0.23		–	–
Did not receive personal care 2007	=1 Did not receive personal care	0.77		–	–
Received residential care 2007	=1 Received residential care	0.08		–	–
Did not receive residential care 2007	=1 Did not receive residential care	0.92		–	–
Received long-term care 2007	=1 Received long-term care	0.39		–	–
Did not receive long-term care 2007	=1 Did not receive long-term care	0.61		–	–
Independent variables					
Predisposing factors					
Gender	=1 Man	0.38		–	–
Gender	=1 Woman	0.62		–	–
Age	=1 65–69 years	0.27		–	–
Age	=1 70–74 years	0.21		–	–
Age	=1 75–79 years	0.18		–	–
Age	=1 80+ years	0.35		–	–
Status of origin	=1 Ethnic Dane	0.95		–	–
Status of origin	=1 Immigrant from a western country and has lived in Denmark less than 10 years	0.007		–	–
Status of origin	=1 Immigrant from a western country and has lived in Denmark more than 10 years	0.013		–	–
Status of origin	=1 Immigrant from a non-western country and has lived in Denmark less than 10 years	0.006		–	–

Variable	Explanation	Mean	SD	Min	Max
Status of origin	=1 Immigrant from a non-western country and has lived in Denmark more than 10 years	0.028		–	–
Previous occupation	=1 Blue-collar worker	0.20		–	–
Previous occupation	=1 White-collar worker	0.14		–	–
Previous occupation	=1 Manager or superior servant	0.12		–	–
Previous occupation	=1 Self-employed	0.04		–	–
Previous occupation	=1 Unemployed	0.10		–	–
Previous occupation	=1 Outside the labour force	0.23		–	–
Previous occupation	=1 Occupation unknown	0.18		–	–
Education	=1 Primary school only	0.39		–	–
Education	=1 Skilled worker	0.27		–	–
Education	=1 Secondary school	0.02		–	–
Education	=1 Short or medium-cycle higher education	0.09		–	–
Education	=1 Long-cycle higher education	0.04		–	–
Education	=1 Education unknown	0.20		–	–
Enabling factors					
Marital status	=1 Widow/widower	0.34		–	–
Marital status	=1 Divorced	0.21		–	–
Marital status	=1 Married	0.35		–	–
Marital status	=1 Unmarried	0.10		–	–
Household	=1 Live alone	0.66		–	–
Household	=1 Does not live alone	0.34		–	–
Income	Average yearly household income in 2004 and 2005 (10,000 DKK)	17.402128	0.078717	–154.511400	1709.485800
Need factors					
Health insurance services	Number of health insurance services 2000–2005	193.85	0.73	1	3,037
Bed days	Number of bed days in hospital 2000–2005	1.9	0.02	0	581

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