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ORIGINAL ARTICLE

Equity in GP and specialist contacts by older persons in Belgium

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Abstract
Objectives To explore the existence of socioeconomic differences in probability and intensity of general practitioner (GP) and specialist contacts among the Belgian elderly population, compared with the younger population.
Methods A nationally representative cross-sectional study based on 4,825 older (≥65) and 14,738 younger participants (<65) in the Belgian Health Interview Surveys 2001 and 2004. Socioeconomic differences in contacts with a GP and specialist were examined using two-part hurdle models; use versus nonuse by logistic regression, and intensity of use by zero-truncated negative binomial regression.
Results The intermediate income group was more likely to contact a GP and tenants reported more GP contacts. Lower educated older persons were less likely to contact a specialist and household income seemed to play a role in the intensity of specialist contacts.
Conclusions The probability and intensity of general practitioner and specialist contacts among the Belgian older population are mainly determined by sociodemographic and health status variables, but a certain degree of inequity remains. The socioeconomic gradient differs in probability and intensity of contacts, indicating the advantage of using a two-part model in investigating socioeconomic differences in healthcare utilisation.

Keywords Elderly people · General practitioner · Specialist · Socioeconomic status · Two-part model · Belgium

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Introduction

Equitable healthcare systems aim to provide services based on individual needs, and not on socioeconomic status (SES). Research on the occurrence of SE gradients in the number of general practitioner (GP) or specialist contacts in the general population is relatively widespread (Dunlop et al. 2000; Habicht and Kunst 2005; Asada and Kephart 2007; van Doorslaer and Jones 2004; Gerdtham 1997), while SE differences have much less been explored within the older population. Evidence on the existence and nature of SES differences in contacts with a GP and specialist in these studies is inconsistent. In a previous study by Hoeck et al. (2011), initial differences in probability of contact with a GP and specialist between the different SE groups among the elderly disappeared after adjustment for the main determinants of healthcare utilisation, while SES still influenced contacts in the younger population (Hoeck et al. 2011).

The processes determining probability versus intensity of use may be different. Individual patients primarily make the decision of contacting a GP or specialist or not, but healthcare providers play a major role in determining the

number of following contacts. Research has shown that, in the older population lower SE groups more frequently contact a GP (Rogowski et al. 2008; McNiece and Majeed 1999), and less frequently contact a specialist (Gerkens et al. 2010). Although Hoeck et al. (2011) found no evidence of SE gradients in GP and specialist contact probability for the Belgian older population after adjustment for the main confounders (Hoeck et al. 2011), the number of contacts could still depend on SES.

The objective of this study is, therefore, to explore the existence of SE gradients, in the probability and intensity of use of GP and specialist services among older persons in Belgium and to compare the patterns with results for the younger population. Exploring both the probability (use vs. non-use) and the intensity of use (number of contacts) implies incorporating a two-stage process, and leads to a more profound understanding of the impact of SES on GP and specialist contacts. To our knowledge, there are no Belgian studies analysing healthcare utilisation incorporating this two-stage process. There could be a link between specific particularities of the Belgian health system (such as direct access to specialist services without need for referral by a GP, specific measures to improve accessibility and high insurance coverage) and the impact of SES on GP and specialist contacts (Gerkens et al. 2010).

Methods

Data

This cross-sectional study is based on pooled data (2001 and 2004) of the Belgian Health Interview Survey (HIS) (Demarest et al. 2006) in which a representative sample of the Belgian population of 15 years and over was interviewed about their lifestyle, health status, and healthcare utilisation. Statistical analysis was restricted to non-institutionalised older persons (65 and over; $n = 4{,}825$) in comparison with the part of the population under 65 ($n = 14{,}738$). A more detailed description of the study population is presented in Table 1, under the paragraph "Results".

Operationalisation

Healthcare utilisation measures used were numbers of contacts with a GP or specialist within the last 2 months prior to the interview, based on the variables 'having at least one contact with a GP/specialist within the last 2 months' and 'number of contacts with a GP/specialist in the last 2 months'. GP contacts include visits during the GPs office hours, visits at home and consultations over the phone. Specialist contacts exclude consultations with a specialist during hospital admission or contact with an emergency department. Our model of healthcare utilisation is based on the socio-behavioural model of Andersen, which includes the most important determinants of healthcare utilisation (Andersen 1995). These comprise predisposing factors indicating the propensity of healthcare utilisation (age, sex, educational level), enabling factors that influence the ability to use care and/or facilitate access to healthcare and the quantity of care received (partner status, income, housing tenure, environmental determinants), and need factors determined by the health status of an individual.

GP and specialist contacts were analysed with adjustment for age, sex, and highest educational level within the household as predisposing factors. Enabling factors considered in this study were living situation, equivalent household income, housing tenure and region. Equivalent household income takes into account household size and composition using the modified OECD scale, and measures income from work and allowances (including pension, but not wealth, properties, rent, interests or other indicators of financial capacity) (Atkinson et al. 1995). Since health status is a multidimensional concept, we included several health indicators as need factors, covering different domains: self-assessed health, functional restrictions, and comorbidity. 'Self-assessed health' was evaluated from the answers to the question 'How is your health in general?', which were recoded into two categories: 'good to very good health' and 'moderate, bad to very bad health'. The indicator 'functional restrictions' was based on ten items measuring functional limitations and limitations with activities of daily living (ADL), such as walking distance, transfer in and out of bed, dressing and undressing. The categorical variable 'comorbidity' is based on the occurrence of 13 chronic diseases in the past year, grouped into six clusters (Picavet and van den Bos 1997). A more detailed description of these health status indicators is provided elsewhere (Hoeck et al. 2011).

Statistical model

We explored SE gradients in the probability and intensity of contacts with GP and specialist, for the younger (under 65) and older (65 years and older) HIS respondents, resulting in four negative binomial hurdle regressions. Standard techniques to estimate count variables, such as Poisson regression and negative binomial regression, imply that there is one single process generating the number of doctor visits (Gruber and Kiesel 2010) and this could lead to inconsistent or biased results (Zaninotto and Falaschetti 2010). Two different processes are responsible for the

Table 1 Characteristics of the study population (absolute numbers and weighted percentages) (Belgium, 2001 and 2004)

	Number of participants (% total)[a]	
	65+	65−
Total number	4,825 (100.0)	14,738 (100.0)
Year of the survey		
2001	2,031 (52.2)	7,766 (51.5)
2004	2,794 (47.8)	6,972 (48.5)
Age (years)		
0–14		151 (1.2)
15–24		2,191 (16.5)
25–34		3,084 (20.3)
35–44		3,502 (23.8)
45–54		3,149 (21.9)
55–64		2,661 (16.3)
65–74	2,630 (58.8)	
75–84	1,561 (34.8)	
≥85	634 (6.4)	
Sex		
Female	2,706 (42.7)	7,599 (50.5)
Male	2,119 (57.3)	7,139 (49.5)
Living situation		
No information	363 (6.1)	1,475 (9.5)
Cohabitant with other(s)	2,720 (60.3)	11,013 (78.4)
Living alone	1,742 (33.6)	2,250 (12.1)
Place of residence		
Flemish region	1,702 (58.7)	5,220 (58.2)
Brussels Capital region	1,225 (9.2)	3,597 (9.8)
Walloon region	1,898 (32.1)	5,921 (32.0)
Highest level of education within the household		
No information	207 (3.8)	411 (2.4)
No degree or primary education	1,594 (35.0)	1,566 (9.7)
Lower secondary	1,145 (23.9)	2,437 (16.2)
Higher secondary	1,052 (21.9)	4,643 (33.2)
Higher education	827 (15.4)	5,681 (38.5)
Equivalent household income (€)		
No information	653 (13.2)	2,076 (14.8)
<750	542 (11.0)	563 (3.2)
750–1,000	944 (19.8)	1,027 (5.5)
1,000–1,500	1,385 (30.2)	2,617 (16.5)
1,500–2,500	1,010 (21.3)	4,538 (31.0)
>2,500	291 (4.5)	3,917 (29.0)
Housing tenure		
No information	116 (1.6)	165 (1.0)
Home-owner	3,549 (77.2)	9,943 (72.5)
Tenant	1,160 (21.2)	4,630 (26.5)
Contacts with GP during the past 2 months		
No information	120 (2.7)	268 (1.8)
0	1,278 (25.9)	8,567 (58.0)
1	1,501 (29.3)	3,658 (25.0)
2	1,252 (26.5)	1,387 (9.3)

Table 1 continued

	Number of participants (% total)[a]	
	65+	65−
3	274 (6.0)	405 (2.9)
4	229 (5.2)	226 (1.5)
5	50 (1.1)	75 (0.5)
6–10	106 (2.9)	137 (0.9)
>10	15 (0.3)	15 (0.1)
Contacts with specialist during the past 2 months		
No information	108 (2.3)	261 (1.5)
0	3,408 (70.9)	11,216 (78.4)
1	895 (18.5)	2,049 (12.7)
2	245 (4.6)	700 (4.2)
3	83 (1.8)	234 (1.5)
4	35 (0.8)	117 (0.7)
5	16 (0.3)	54 (0.3)
6–10	28 (0.6)	86 (0.5)
>10	7 (0.2)	21 (0.1)
Self-assessed health		
No information	519 (7.3)	974 (5.1)
Good to very good health	2,315 (49.8)	11,057 (77.8)
Moderate, bad to very bad health	1,991 (42.9)	2,707 (17.1)
Functional restrictions		
No information	388 (7.7)	1,069 (7.6)
Not functionally restricted	2,046 (45.3)	11,827 (81.2)
Moderately restricted (one activity)	1,433 (28.6)	1,426 (8.8)
Severely restricted (two or more activities)	958 (18.4)	416 (2.4)
Comorbidity		
No information	174 (3.1)	377 (2.2)
No chronic diseases	1,597 (32.8)	10,096 (70.8)
Chronic disease(s) belonging to one cluster	1,857 (40.2)	3,347 (21.7)
Chronic diseases belonging to more than one cluster	1,197 (23.9)	918 (5.3)

[a] See reference Van Oyen et al. (1997)

probability and intensity of contact. Therefore, a two-part hurdle model is needed (Pohlmeier and Ulrich 1995; Cameron and Trivedi 1998; Santos Silva and Windmeijer 2001; Deb and Trivedi 1997; Gurmu 1998). The first part of the hurdle model consists of a logistic regression (logit), wherein the probability of GP or specialist contact (yes or no) is estimated, reflecting the patient's decision to contact the healthcare provider or not. The second part of the hurdle model is a zero truncated negative binomial regression (ZTNB), wherein the number of GP or specialist contacts is estimated, reflecting the doctor's influence on possible following contacts (Cameron and Trivedi 1998; Long and Freese 2006). In the resulting model, two columns of coefficients are displayed. In the first column, logit coefficients indicate a positive or negative influence of the independent variables (sociodemographic variables and health status) on the probability of GP or specialist contact. In the second column, ZTNB coefficients indicate a positive or negative influence of the same independent variables on the number of GP or specialist contacts.

The sample size in the hurdle model is based on all cases with complete data concerning all the variables used in the analysis. Proxy interviews were excluded from the analysis, because the variable 'self-assessed health', a crucial dimension of health status, was not available in these cases. SE effects are adjusted for age, sex, health status, region and living situation. We analysed the interaction between age (recoded in categories 65+ and 65−) and the impact of SES (equivalent household income, highest educational level within the household and housing tenure) on GP and specialist contacts, to explore differences in the impact of SES on GP and specialist contacts between the older and younger population. All analyses were carried out in Stata-MP, version 10.

Table 2 Two-part models of probability and intensity of GP contacts in the past 2 months of 65+ ($n = 2{,}891$) and 65− ($n = 9{,}435$) participants, adjusted for age, sex, health status, region, and living situation (Belgium, 2001 and 2004)

	65+		65−	
	Logit	ZTNB	Logit	ZTNB
Age	0.04***	0.01	0.01***	−0.01**
Sex				
Female	0.38**	0.06	0.19***	0.14
Male				
Health Status				
Self-assessed health				
Moderate to very good health				
Bad to very bad health	0.76***	0.48***	0.89***	0.75***
Comorbidity				
No chronic diseases				
Chronic disease(s), one cluster	0.47***	0.16	0.62***	0.39***
Chronic disease(s), more than one cluster	1.67***	0.42**	1.16***	0.87***
Functional restrictions				
Not functionally restricted				
Moderately restricted	0.13	0.28**	0.18	0.37***
Severely restricted	0.35	0.35***	0.49*	0.45***
Region				
Flemish region				
Brussels Capital region	−0.48**	−0.14	−0.49***	−0.38***
Walloon region	−0.24	−0.09	−0.06	−0.14
Living situation				
Cohabitant with other(s)				
Living alone	0.07	−0.14	0.02	0.05
Equivalent household income (€)				
<750	0.25	0.10	−0.21	0.27
750–1,000	0.57	0.17	−0.10	0.29
1,000–1,500	0.59*	0.20	−0.05	0.18
1,500–2,500	0.27	0.16	−0.01	0.13
>2,500				
Highest level of education within the household				
No degree or primary	0.43	0.12	−0.08	0.04
Lower secondary	−0.24	−0.03	0.04	0.24
Higher secondary	−0.15	−0.15	0.04	0.07
Higher education				
Housing tenure				
Tenant	−0.19	0.22*	0.12	0.18
Home-owner				
Constant	−3.51***	−1.21*	−1.28***	−1.25***
Ln alpha		−0.72**		0.90*
n	2,891	2,891	9,435	9,435

Statistically significant coefficients * $p < 0.05$, ** $p < 0.01$, *** $p \leq 0.001$ (Wald Chi-square test)

ZTNB Zero truncated negative binomial (number of contacts), *Ln alpha* dispersion parameter of negative binomial regression

Table 3 Two-part models of probability and intensity of contact with a specialist and the number of contacts with a specialist in the past 2 months of 65+ ($n = 2{,}916$) and 65− ($n = 9{,}456$) participants, adjusted for age, sex, health status, region, and living situation (Belgium, 2001 and 2004)

	65+		65−	
	Logit	ZTNB	Logit	ZTNB
Age	−0.02*	−0.05*	−0.00	−0.02**
Sex				
Female	0.07	−0.32	0.54***	−0.03
Male				
Health Status				
Self-assessed health				
Moderate to very good health				
Bad to very bad health	0.75***	0.33	0.85***	0.44**
Comorbidity				
No chronic diseases				
Chronic disease(s), one cluster	0.49**	0.98**	0.55***	−0.15
Chronic disease(s), more than one cluster	0.67***	1.03**	0.94***	0.50*
Functional restrictions				
Not functionally restricted				
Moderately restricted	0.25	0.67*	0.36***	0.43**
Severely restricted	0.35*	0.84**	0.60***	0.30
Region				
Flemish region				
Brussels Capital region	0.37**	0.23	0.40***	0.25
Walloon region	−0.09	−0.82***	0.24**	−0.08
Living situation				
Cohabitant with other(s) at home				
Living alone	0.15	0.06	0.17	0.10
Equivalent household income (€)				
<750	−0.48	0.76	−0.22	−0.21
750–1,000	−0.34	0.88*	−0.01	−0.06
1,000–1,500	−0.08	0.66	0.24*	0.13
1,500–2,500	0.15	0.73*	0.14	0.08
>2,500				
Highest level of education within the household				
No degree or primary	−0.49*	−0.46	−0.83***	−0.25
Lower secondary	−0.49*	−0.37	−0.52***	−0.06
Higher secondary	−0.45*	−0.48	−0.41***	0.28
Higher education				
Housing tenure				
Tenant	0.16	0.36	−0.01	0.00
Home-owner				
Constant	0.02	−12.63***	−1.97***	−14.28***
Ln alpha		15.03***		15.17***
n	2,916	2,916	9,456	9,456

Statistically significant coefficients * $p < 0.05$, ** $p < 0.01$, *** $p \leq 0.001$ (Wald Chi-square test)

ZTNB Zero truncated negative binomial (number of contacts), *Ln alpha* dispersion parameter of negative binomial regression

Results

Table 1 shows the characteristics of the study population. 71.4 % of the older respondents (≥65) had at least one contact with a GP and 26.8 % had at least one contact with a specialist in the past 2 months, compared to 40.2 and 20.1 % in the younger (<65) population, respectively.

The health status of elderly persons varies significantly according to SES, even after adjustment for age and sex. Lower SE groups have a worse self-assessed health, are more likely to be moderately or severely functionally restricted and are more likely to suffer from (a) chronic disease(s) than higher SE groups. Tenants more often suffer from comorbidity than home-owners (results not shown). The existence of SE gradients in health status underlines the importance of controlling for health status when studying SE differences in healthcare utilisation.

General practitioner

Table 2 shows the results of hurdle regressions for GP contacts in the past 2 months by older (65 years and older, $n = 2{,}891$) and younger (under 65) HIS respondents ($n = 9{,}435$).

In both groups, the coefficients in the first column (logit) indicate that probability of GP contact differs according to age, sex, health status and region. Older respondents with a household income of €1,000–1,500 are more likely to report a GP contact than those with an income of >€2,500. In contrast with the older persons, household income does not influence the probability of contacting a GP among the younger respondents. The coefficients of the ZTNB regressions in the second column indicate that age does not affect the number of GP contacts in older persons, while it has a significant impact in the younger population. There are no differences in number of GP contacts according to sex. Health status significantly influences the number of GP contacts. Older persons who are worse off in terms of self-assessed health, comorbidity and functional restrictions more frequently contact a GP. Younger respondents reveal the same pattern, although comorbidity plays a slightly more significant role in the number of GP contacts, compared to older respondents. In contrast with the younger population, the number of GP contacts of older persons does not vary according to region. Living situation has no effect on the number of GP contacts, neither in the older nor in the younger population. Household income and highest educational level within the household do not seem to affect the number of GP contacts, both in the older and the younger population. In contrast with the younger respondents, older tenants more frequently contact a GP, compared to home-owners.

Specialist

Table 3 displays the results of the hurdle regressions for contacts with a specialist in the past 2 months by respondents of 65 years and older ($n = 2{,}916$) and, by way of comparison, of the younger (under 65) HIS respondents ($n = 9{,}456$).

Among the older persons, the probability of contacting a specialist differs according to age, health status and region. Furthermore, lower educated are less likely to contact a specialist than higher educated older persons. A somewhat different pattern emerges in the younger population where the probability of contact with a specialist does not depend on age, but differs according to sex. Younger respondents with a household income of €1,000–1,500 are more likely to contact a specialist than those with a household income >€2,500 and lower educated are less likely to contact a specialist than higher educated younger persons. Concerning the number of specialist contacts, increasing age leads, in both groups, to a lower number of contacts, while sex does not affect the number of specialist contacts. Older persons who are worse off in terms of comorbidity and functional restrictions more frequently contact a specialist than those with no chronic diseases or functional restrictions, but self-assessed health has no impact on the number of contacts with a specialist. A somewhat different pattern is displayed among the younger population, where self-assessed health affects the number of contacts with a specialist, while comorbidity and functional restrictions seem to play a less important role compared to the older respondents. Older respondents living in the Walloon region less frequently contact a specialist compared to those living in the Flemish region, while region has no influence on the contacts with a specialist in the younger population. Living situation plays no significant role in the number of contacts with a specialist in both groups. Older respondents with a household income of €750–1,000 or €1,500–2,500 more frequently contact a specialist, while there are no significant differences in contacts with a specialist according to educational level and housing tenure. SES plays no significant role in the number of contacts with a specialist in the younger population.

Interaction between age and the impact of SES on GP and specialist visits

In a next step, the interaction between age (65+ vs. 65−) and SES and their impact on GP and specialist contacts was tested (results not shown). There is a significant interaction between household income and age concerning contacts with a GP (Wald Chi square, $p = 0.026$), meaning that the effect of household income on GP contacts significantly

differs between the 65+ and 65− group. In contrast with the younger population (65−), household income exerts a significantly stronger influence on GP contacts in the older respondents (65+, Table 2). The interaction between age and educational level and age and housing tenure with GP contacts is not statistically significant. Concerning specialist contacts, there are no significant interactions between SES and age.

Discussion

This study examined whether SE gradients in the probability and intensity of use of GP and specialist services occur in Belgian older persons, and whether SE gradients differ between the older and the younger population. By investigating different use of GP and specialist services according to equal needs (under- or overutilisation by different SE groups), possible financial barriers in the access of healthcare could be explored. It could be that lower SE groups tend to avoid contacting a GP or specialist, or that they limit follow-up contacts. Furthermore, inequity in the use of GP and specialist services could also reflect different preferences between SE groups. For instance, SES could influence the initial first contact with a GP or specialist, while SES could also influence the relationship with the healthcare provider and could also affect the number of following contacts or referral to specialist treatment.

Overall the results of this study suggest that there are no important financial barriers in Belgium to the use of GP and specialist care, neither among the −65 population nor among older persons, probably due to an affordable healthcare system (with a health insurance covering the majority of the Belgian population (Gerkens et al. 2010). Educational level has a strong impact on the probability of contact with a specialist, both in the older and younger population, but once the 'first hurdle' has been taken educational level has no further impact on the number of specialist contacts.

In Belgium, there is a broad concern about the equitable funding of healthcare. The Belgian health system is based on the principal of social insurance characterised by vertical (proportional social security contributions related to income) and horizontal solidarity (contributions independent of risk) (Gerkens et al. 2010; Corens 2007). Almost the whole population (>99 %) is covered for a very broad benefits package. Coverage is higher than in some EU Member States, such as the Netherlands and Luxembourg, but worse than in others, such as the UK, France and Germany, where social insurance coverage is 100 % (OECD 2009). To protect the weakest SE groups, including older persons, important measures were taken to improve accessibility and financial equity: patients with preferential reimbursement pay reduced co-payments (called the OMNIO system); a maximum billing system (MAB-system) puts an upper limit (dependent on the net taxable household income) to the total amount of yearly co-payments for healthcare; and a Special Solidarity Fund grants additional reimbursement for patients with rare illnesses or who need very specific treatment (Gerkens et al. 2010). The results of this study indicate that these policy measures are rather effective as there is no lower use of GP and specialist services among the lower income groups.

To investigate SE differences in the probability and number of contacts with a GP and specialist, we have used a two-part model. The strength of this approach lies in its ability to disentangle the processes affecting the probability of contact with a GP or specialist on the one hand, and the number of contacts on the other hand. Our study has a number of limitations though. Firstly, healthcare utilisation data of the HIS are based on self-reported information. Although this approach might be interpreted as not particularly objective, studies indicate that self-reported healthcare utilisation provides a valid estimate of differences in utilisation between SE groups (Reijneveld and Stronks 2001). Health status data are also based on self-reported information. However, this should not be regarded as less reliable as self-reporting has proven to be an efficient method for generating information about a given health status (Simon et al. 2005) and self-assessed health has proven to be a good predictor of disability and morbidity (Ferraro et al. 1997). Secondly, the cross-sectional nature of the HIS prevents to draw conclusions about causal relationships. It is plausible that the effect of SES is underestimated due to mediation effects. To explore causal relationships between need indicators, SES and healthcare utilisation, and to estimate possible direct and indirect effects of SES and health on healthcare utilisation, longitudinal data and data on the life-course are needed.

A third limitation has to do with the non-response rate in health interview surveys which is generally higher among lower SE groups and the less healthy (Dengler et al. 1997; Slymen et al. 1994). Furthermore, lower SE groups are less likely to participate when they have a poor health status (Lorant et al. 2007) and higher educated people are more critical of a given health and are more likely to negatively rate their health (Bago d'Uva et al. 2008). An underestimation of the impact of SE inequalities in the present study is, therefore, plausible. A fourth limitation concerns the multidimensional definition of health status. We included three important dimensions of health (self-assessed health, functional restrictions and comorbidity). However, literature data suggest that these three dimensions are considered the most important determinants of health status and of GP and specialist contacts (Cavelaars et al. 1998; Breeze et al.

2001; Pappa and Niakas 2006). Fifthly, the interpretation of hurdle models depends on the identification of illness spells. Analysis of healthcare utilisation is complicated by the fact that researchers only have information on the total number of contacts in a given observation period, rather than on the number of illness spells and on the number of contacts in each spell (Santos Silva and Windmeijer 2001). Hurdle models are based on the assumption that individuals have at most one illness spell during the observation period and the hurdle model is, therefore, inadequate in the presence of multiple illness spells. The two-part model assumes that the first contact with a GP or specialist leads to the subsequent contacts. This assumption could be violated in our study, as people may have multiple health problems, each of which requires a series of contacts with a GP or specialist (Gerdtham 1997; Pohlmeier and Ulrich 1995). Hurdle models are inadequate if long observation periods, for example 1 year, lead to a growing probability of observing multiple spells and multiple 'first' contacts (Gerdtham 1997). In our study, the presence of multiple illness spells and multiple first contacts is unlikely to be problematic due to the relatively short observation period (2 months). Pohlmeier and Ulrich (1995) argue that in their study (contact with a GP and specialist in the last 3 months), more than 75 % of the individuals in the sample have at most one visit to the doctor, thus the probability of multiple illness spells and multiple first contacts is relatively low. In our study, more than 55 % of the older and 83 % of the younger respondents reported zero or one contact with a GP, compared to 89.4 and 91.1 % that reported zero or one contact with a specialist. Still, we cannot be sure that only single illness spells occur in our database. Also, the sample may include some individuals with incomplete illness spells because part of the recorded contacts with a GP or specialist may result from an illness spell that started before the observation period of 2 months prior to the survey. Moreover, some individuals may continue to contact the GP or specialist after the observation period as a consequence of an illness spell that started during the observation period (Pohlmeier and Ulrich 1995). A final, but very important limitation is the use of complete cases only in our analysis. Modern health related research should include missing data, especially if results are affected. Concerning the data of the Belgian HIS, research has indicated that the influence of missing data is negligible. No important differences were found between complete case analysis and the multiple imputation based results (Burzykowski et al. 1997). Furthermore, due to the complexity of multiple imputation on multistage survey designs, such as the Belgian HIS, multiple imputation poses important risks and leads to biased and misleading results (Sterne et al. 2009). More research is needed and this procedure goes beyond the scope of our article.

Conclusion

In our study, it appears that probability and number of GP and specialist contacts are mainly determined by sociodemographic and health status variables, both in the younger and older respondents, although a certain degree of inequity remains. Our study emphasizes that in Belgium income exerts a (minor) impact on the probability of GP contact among older persons, whereas this is not the case among the population <65 years. The income differences that we find in the number of specialist contacts are not clear-cut. While there are no significant differences according to household income in the probability of contacting a specialist, household income influences the number of specialist contacts among the elderly respondents. Contacts with a GP do not depend on educational level, but educational level exerts a strong influence on the probability of contacting a specialist, in both the younger and elderly population. Lower educated people are less likely to contact a specialist, but the number of following contacts with a specialist does not vary according to educational level. The finding that SE gradient differs between the probability and the number of contacts underscores the advantage of hurdle regression to investigate SE differences in healthcare utilisation.

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