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Socio-demographic, socio-economic and health need differences between types of care use in community-dwelling older adults

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Key words: informal care, formal care, older adults, socio-economic/socio-demographic characteristics

Abstract

This paper aims to identify relations between socio-demographic, socio-economic characteristics and the use of informal and formal care.

All analyses were performed on data of the Belgian Ageing Studies, a survey among community-dwelling older people (60+) in Belgium. Latent Class Analyses were used to identify types of care use and bivariate analyses to assess differences within these types. Eight different types were identified. Results demonstrate that use of formal care increases with age and is not related to socio-economic status.

The conclusion highlights how the complexity of different types of care use might be a challenge for our ageing society.

Introduction

Worldwide, the population is ageing. In Belgium, for example, the percentage of people older than 65 years is predicted to grow from 18.3% in 2016 to 22.3% in 2030. The proportion of people aged 80 years and older is projected to increase from 5.5% to 6.5% in the same period (Federaal Planbureau, 2016). With increasing age, the possibility of becoming frail is growing as is the accompanying need for care and support (Daniels et al, 2012; Regueras and Verniest, 2014). Responding to these developments, in many countries there is increasing policy attention to 'ageing in place' and 'community-based care' (Sixsmith et al, 2008; Wiles et al, 2011). This attention responds to people indicating that they want to live independently in their own homes for as long as possible, with appropriate formal and informal assistance. It is part of a long-term care policy in which institutionalisation is only deployed when homecare is no longer an option (Vermeulen et al, 2011). These issues are increasingly recognised by policymakers. For example, in February 2016 the Belgian Federal Minister of Healthcare launched a project call for pilot projects developing strategies for chronic and integrated care for the ageing population (RIZIV, 2016).

In recent years, preventative home-based support and health promotion for older people has gained more attention, with the aim of identifying older people who lack sufficient care (Stijnen et al, 2012). Accurate case-finding¹ for older people in need of care is extremely important in order to provide the appropriate care and support at the right time (Ross et al, 2011). Despite the evident need, 'preventive home visits' appear to have very limited results when studied. A possible explanation might be found in the fact that these interventions have been conducted in a general population of older people, already benefiting from an elaborate level of assistance (Boumans et al, 2008). This emphasizes the importance of accurate identification and case-finding for frail older adults who currently lack care (Sutorius et al, 2015).

In order to maintain their independence and stay in their own home, older people are using a broad range of informal and formal assistance (Hoeck et al, 2011; Jacobs et al, 2015). Within older populations, access to informal and formal care services is extremely important for preventing illnesses, adapting therapies to changing needs, potentially reducing acute care costs, and for maintaining the health and well-being of the ageing population (Thorpe et al, 2011). Despite the fact that health needs and health services usage are higher among older groups, horizontal equity in care

¹ Case-finding is the application of a diagnostic test or clinical assessment in order to optimally identify those with the disorder with minimal false positives. Case-finding is often performed in a selected population at high risk for a condition (Mitchell et al, 2011).

use remains relatively unexamined in the literature on older people (Allin et al., 2006; Artazcoz and Rueda, 2007). Access to care for older people continues to be a concern, because as people grow older they are more vulnerable to physical and financial constraints that might impede timely utilisation of the healthcare services needed (Moblely et al, 2006). This is recognised by the European Commission, which stated in a recent report that health inequalities in the EU countries need to be reduced (OECD/EU, 2016). Most European countries have achieved universal (or near-universal) coverage of health care costs for a core set of services, which usually include consultations with doctors, tests and examinations and hospital care. Nevertheless, large inequalities in health and life expectancy still exist between people with higher levels of education and income and the more disadvantaged (Draper et al, 2014). This is largely due to different exposure to health risks, but also arises from disparities in access to high quality care (Mackenbach et al, 2008; OECD/EU, 2016). Age seems to be a factor linked to unmet needs for medical care, due to being too expensive, too far to travel or involving long waiting lists in most of the EU Member States (Chaupain-Gaullot et al, 2014; Eurostat, 2016).

Research shows that there are differences in the use of informal and formal care by older people, according to their socio-demographic and socio-economic characteristics; people over 75 years, and those who are disabled, single or widowed are more likely to receive informal help from outside the household (Broese van Groenou et al, 2006). Paraponaris et al (2012) also found that socio-demographic and socio-economic characteristics were an important predictor for the use of informal and formal care by frail older people. They concluded that low socio-economic status increases difficulties in accessing formal care and that public policies should better support informal care. The results of research in the United Kingdom indicate that older individuals in receipt of lower income are significantly less likely to visit a general practitioner, specialist or dentist, although they often express a greater need (Allin et al, 2006). Suanet et al (2012) also discovered that societal determinants such as culture, welfare state context and demographic composition have a role in understanding care use.

Other research indicates several health factors associated with access to and use of formal care, such as functional capacity and health status (Blomgren et al, 2008; Matthews, 2015). In most existing research about personal characteristics and formal / informal care use, either the receipt of formal care, informal care or a combination of both is investigated (Broese van Groenou et al, 2010; Carriere et al, 2006; Davey et al, 2005; Gannon et al, 2010). Several authors have already shown the existence of mixed care or support arrangements among home care users (Pinquart and Sörensen, 2002; Hlebec, 2015; Hlebec and Flipovic Hrast, 2016). For example, Hlebec's (2015) case study in Slovenia investigated care arrangements among home care users and gives information about how older adults

combine informal care with formally provided care based on 22 activities of daily living. Rodríguez (2013) also concluded that in Spain 47.8% of community-dwelling older adults are receiving informal care, 4.9% formal care and 9.8% a combination of both. However, these studies did not investigate the different possible combinations of care providers within these arrangements. This is also stated by Carrière et al (2006), who indicated that although there are many studies on the use of health care services among older adults, few have looked at the diverse combinations of formal and informal sources of assistance. While this research is without doubt very valuable, it focuses on a more restricted view of care combinations. In this paper, more types and patterns of care use are investigated, based on potential combinations of a broad range of care providers used by older adults in daily life. The perspective of this paper is to go beyond the classical distinction between three patterns of care use (informal, formal and mixed care use).

A good knowledge of the socio-demographic and socio-economic profiles of older people can give very useful information to provide the appropriate care and support at the right moment and can avoid people in need being left undetected (Broese van Groenou et al, 2006).

In response to the aforementioned research gaps, the current article addresses the following research questions:

- 1) Which different patterns of formal and informal care use can be detected among Belgian community-dwelling older adults?
- 2) What is the relation between socio-demographic, socio-economic characteristics, health needs and these identified patterns of care use?

With the first research question, we aim to explore existing patterns of different informal, formal and mixed care usage among community-dwelling older adults starting from their self-prescribed care usage. With the second research question, we investigate how socio-demographic, socio-economic characteristics and health needs relate within these patterns, with the aim of identifying groups that could benefit from using better preventive home-based support.

Methods

Data collection

The data used in this study is cross-sectional and originates from the Belgian Ageing Studies (BAS), a research project which explores the needs and aspects of quality of life among community-dwelling older adults (that is, informal care, formal care, frailty, well-being, social participation, housing, etc.) by using a standardised survey (see De Donder et al, 2014 for a full description). The data for the current paper was gathered between 2008 and 2014 from 38,066 community-dwelling older adults aged 60 years and over, living in 83 municipalities in the Dutch-speaking part of Belgium (Flanders) and in Brussels.

The BAS-project used a participatory peer-research method. It embraced older adults as essential partners in the project and as partners in the data collection. Older volunteers were recruited through local authorities and associations and trained in how to deliver and collect the questionnaires. The questionnaire was self-administered, but on request the volunteers were allowed to clarify questions. If a respondent refused or had difficulty in filling in the questionnaire, the volunteer received a replacement address in the same quota category to obtain the intended sample size. The respondent was free to participate, and anonymity was guaranteed. The respondent was assured of the right to refuse to answer, and of privacy. More information on the research methodology can be found in De Donder et al (2014).

Sample

The municipalities involved decided voluntarily to participate in the research project. A representative sample was drawn in each participating municipality by randomly selecting community-dwelling older adults from relevant population registers, stratified by age (60-69; 70-79; 80+) and gender. The sampling fraction depended on the size of the municipality, varying between N = 109 and N = 984. This implies that the samples were representative for each municipality, not for the whole of Flanders.

Only community-dwelling older people who received any type of care or assistance, plus older people who were shown to be in need of care and assistance but did not receive it, were included in the analysis in the current paper (N=12,481). The data consisted of 35.7% men and 64.3% women. In the sample, 26.9% of the older adults were aged between 60 and 69 years, 36.0% between 70 and 79 years and 37.1% were aged 80 years and over. Concerning their marital status, 56.4% of older adults were

married, 33.5% widowed, 4.5% never married, 4.1% divorced and 1.6% cohabiting. In terms of education, 45.3% of older adults had completed only primary education (up to the age of 12 years) or had no qualification at all, while 11.7% had undertaken higher education. Finally, 21.0% of older adults had a monthly household income of under 1,000 euros, 40.5% of 1,000 - 1,499 euros, 18.8% of 1,500 - 1,999 euros, and 19.7% of more than 1,999 euros. According to the Comprehensive Frailty Assessment Instrument (CFAI) (De Witte et al, 2013b), 23.5% of the sample appeared to be 'low' frail, 33.8% were 'moderate' frail and 42.7% were 'high' frail. The reference categories within the data of the Belgian Ageing Studies (representative of people aged 60 and over in the participating municipalities) were: 45.6% low frail, 33.3% moderate frail and 21.1% high frail.

Measures

To measure informal and formal care use, respondents were asked if they received care from 15 different possible care providers (persons or organisations), both informal and formal. These different items were divided into seven categories of care use (0 = no, i.e. receiving no help from this category; 1 = yes, receiving help from this category). Four of the seven categories referred to informal care: help and care from within (1) the nuclear family (partner and/or children); (2) the extended family (grandchildren and/or other relatives); (3) friends and acquaintances; and (4) neighbours. The other three categories referred to formal care: (1) general practitioner; (2) home nursing; and (3) formal home assistance (homecare services, cleaning services, grocery services, chores services, senior companion services, hot meals and/or day care/short term care). In addition, an eighth category referred to a group of older people who indicated that they were in need of care and assistance but did not receive any such support.

The following independent variables were measured:

- Socio-demographic characteristics: gender (male, female); age (60-69 years, 70-79 years, 80 years and over) and marital status (married, never married, divorced, cohabiting, widowed)
- Socio-economic characteristics: education (no education or primary education, lower secondary education, higher secondary education, higher education) and monthly household income (500€-999€, 1000€-1499€, 1500€-1999€, more than 2000€)
- Health needs: being in need of help for three activities of daily living (ADL) (Do you need help with the following activities: personal care, household activities and personal mobility? – yes/no).

Statistical analyses

In a first step, Latent Class Analysis (LCA) was performed to identify classes of informal care and formal care use among community-dwelling older adults. This technique is used to analyse relationships in categorical data and enables the characterisation of latent (unobserved) variables through analysing the structure of the relationships among several manifest (observed) variables. In this study, Latent Class Analysis categorised the groups of older people based on similarities in their informal and formal care use (McCutcheon, 1987). LEM software was used to conduct the Latent Class Analysis (Vermunt, 1997). To determine an optimal exploratory model, we started computing a latent class model with only one single latent class and increased the number of classes, while checking for a model fit. The goodness of fit was assessed using the Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC) of L-square. The lower the AIC and BIC, the better the model fit. To avoid creating too many classes of care use and to enhance manageability and interpretability, a model was accepted when both AIC and BIC showed negative values (Nylund et al, 2007). To detect boundary estimates, avoid local optima and ensure that non-identified parameters estimates did not affect the values of the latent class probabilities, the chosen model was conducted 20 times using different starting values. We considered the best solution out of 20 as the global optimum (e.g. Van der Ark and Richards, 2006). In order to perform statistical analyses with classes derived from the LCA, we created a single latent variable with a set of underlying classes by modal class assignment (McCutcheon, 1987). The different classes were considered as a nominal variable in the final analytical model.

In a second step, we analysed the data using the Statistical Package for the Social Sciences (SPSS), version 23, IBM using bivariate analyses. Chi-square analyses were performed to explore differences in socio-demographic and socio-economic characteristics and the health needs of older adults, between the different classes of care use (developed by LCA in the first step). Additionally, we used standardised residuals to assess the strength of the difference between observed and expected counts and to investigate which cells were contributing the most to the chi-square value (Agresti, 2007). Standardised residuals greater than 121 are discussed.

Results

Combinations of informal and formal care use of community-dwelling older adults

Table 1 reports the results of the Latent Class Analysis. When both the AIC and BIC showed negative values, LCA reported eight different classes of care use among community-dwelling older adults (AIC = -2,8781, BIC = -477,2497).

Table 1. Classes of informal care and formal care use of community-dwelling older adults: results Latent Class Analysis (N = 12,235)

Classes of care use	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Probability to receive care from								
Nuclear family	70.48%	98.12%	71.93%	98.64%	84.36%	94.37%	0.00%	24.91%
Extended family	17.03%	52.49%	52.88%	85.11%	83.51%	53.55%	19.42%	2.78%
Friends and acquaintances	5.93%	6.87%	67.72%	86.90%	91.21%	8.80%	23.63%	0.83%
Neighbours	2.22%	14.85%	60.39%	88.69%	90.72%	22.28%	27.25%	0.66%
General practitioner	7.84%	40.74%	28.70%	71.67%	82.43%	60.54%	65.87%	4.30%
Home nursing	6.34%	0.00%	0.00%	14.45%	60.65%	82.15%	52.32%	18.18%
Formal home assistance	0.04%	36.18%	36.18%	11.49%	84.32%	66.58%	78.19%	86.41%

The first three classes of care use were characterised by older adults who were more likely to receive care *which was dominated by informal caregivers*. Class 1 represented 19.9% of the sample and consisted of older care recipients who were more likely to receive care only from nuclear family caregivers, i.e. care from the spouse and/or children. Class 2 (18.8% of the sample) identified care recipients who were more likely to receive care from both nuclear and extended family caregivers, i.e. care from spouse, children, grandchildren and/or other relatives. Class 3 (6.1% of the sample) comprised older people who were more likely to receive care from all different types of informal caregivers, i.e. nuclear and extended family caregivers, friends and acquaintances, and neighbours.

Second, there were three classes of care use characterised by older adults who were more likely to receive care from *both informal caregivers and formal care providers*. Class 4 (8.2% of the sample) identified older adults who were more likely to receive care from all informal caregivers in combination with care from the general practitioner. Older care recipients in class 5 (6.8% of the sample) were more likely to receive care from all informal caregivers in combination with care from all formal care

providers, i.e. care from the general practitioner, home nursing and formal home assistance. Class 6 represented 12.9% of the sample and consisted of older people who were more likely to combine informal care from family (both nuclear and extended) with formal care from all formal care providers.

Finally, two classes of care use consisted of older adults who were more likely to receive care *dominated by formal caregivers*. Class 7 (4.5% of the sample) comprised older care recipients who were more likely to receive care from all formal caregivers. Class 8 represented 19.0% of the sample and consisted of older people who were more likely to receive formal home assistance.

Furthermore, 477 (3.8%) older adults reported to be in need of care, but did not receive it (class 9). They were added as an additional class. An overview of the nine classes can be found in the table below.

Table 2. Overview of the nine different classes

Class	Receiving help or care from	Frequency (%)
Class 1	Nuclear family	2486 (19.9%)
Class 2	Nuclear and extended family	2346 (18.8%)
Class 3	All informal caregivers	765 (6.1%)
Class 4	All informal caregivers + general practitioner	1018 (8.2%)
Class 5	All informal + formal care providers	847 (6.8%)
Class 6	Family (nuclear and extended) + all formal care providers	1616 (12.9%)
Class 7	All formal care providers	558 (4.5%)
Class 8	Formal home assistance	2368 (19.0%)
Class 9	Nobody	477 (3.8%)

Differences in informal care and formal care use

By means of Chi-square analyses, we compared these nine different classes according to their socio-demographic, socio-economic characteristics and health needs (Table 3). We found several significant relationships between the socio-demographic, socio-economic characteristics, the health needs and the different classes. The standardised residuals allowed us to investigate which classes were contributing the most to the Chi-square value. These results are described below.

Gender. Compared to the other classes, older people who received care from all informal caregivers in combination with the general practitioner were more likely to be male (class 4, 43%). Likewise, people who reported that they were in need of care and support but were not receiving it from anyone were more likely to be male (class 9, 43.2%).

Age. Older adults who were receiving care from their nuclear family caregivers (class 1, 39.1%), from different kinds of informal caregivers (both nuclear, extended, friends and neighbours) (class 3, 32.8%) and from all informal caregivers in combination with the general practitioner (class 4, 35.7%) were more likely to be younger (60-69 years). Also, the group of people who reported that they were in need of help but were not receiving it from anyone tended to be younger (60-69 years) (class 9, 43.2%). People who were receiving care and support from both the nuclear and extended family (class 2, 39.9%) and also from all informal and formal care providers (class 5, 50.5%), from family caregivers (both nuclear and extended) in combination with formal caregivers (class 6, 56.7%) and from all formal caregivers (class 7, 46.2%) were more likely to be aged 80+.

Marital status. Older adults who were receiving help and support from the nuclear family (class 1, 67.1%), from family caregivers (both nuclear and extended) (class 2, 61.5%) and from all informal caregivers combined with the general practitioner (class 4, 66.8%) were more likely to be married. Older adults who were receiving help from all informal caregivers (class 3, 9.7%), from all informal and formal caregivers (class 5, 6.7%), from all formal caregivers (class 7, 19.7%) and formal home assistance (class 8, 5.8%) were more likely never to have been married. Older adults who were receiving help from all formal caregivers (class 7, 7.1%) and formal home assistance (class 8, 5.0%) were more often divorced, while older adults who received support from all informal caregivers (class 3, 38.2%), from all informal and formal caregivers (class 5, 43.0%), from a combination of family caregivers (nuclear and extended) and formal caregivers (class 6, 45.4%), from all formal caregivers (class 7, 44.3%) and formal home assistance (class 8, 36.4%) were more likely to be widowed. Older people indicating that they were in need of care and support but who were not receiving it from anyone were more often married (class 9, 65%) or divorced (class 9, 7.1%).

Education. Older adults receiving help from family caregivers (both nuclear and extended) (class 2, 49.1%) and from family caregivers (nuclear and extended) (class 6, 55.6%) more often tended to have no education, or only primary education. Older adults who were receiving help from all informal caregivers (class 3, 17.2%) and formal home assistance (class 8, 14.8%) were more likely to have undertaken higher education.

Also, older people indicating that they were in need of care and support but were not receiving it from anyone were more often highly educated (class 9, 24.2% higher secondary education and 18.5% higher education).

Income. Older adults who received care from family caregivers (nuclear and extended) in combination with formal caregivers (class 6, 25.5%), from only formal caregivers (class 7, 23.1%) and formal home assistance (class 8, 23.1%) were more likely to have a lower household income (500€-999€). Older people who received help from all informal and formal caregivers (class 5, 45.3%), and from family caregivers (nuclear and extended) in combination with formal caregivers (class 6, 46.9%) more often had an income of from 1000€ to 1499€. Older people who were more likely to receive care from the nuclear family (class 1, 21.2% and 25.3%) and from all informal caregivers in combination with the general practitioner (class 4, 21.9% and 23.4%) often had the highest incomes (from 1500€ to 1999€ and above 2000€). Older adults who indicated they were in need of care and support but did not receive it from anyone also tended to have a high income (\geq +2000€) (class 9, 31.2%).

Health needs. Older adults who received care from all informal and formal caregivers (class 5, 35.0%), from family caregivers (nuclear and extended) and formal caregivers (class 6, 60.6%) and from all formal caregivers (class 7, 30.6%) reported more often that they were in need of help with activities of daily living (personal care, household activities and personal mobility).

Table 3. Socio-demographic and socio-economic characteristics of older people according to their class of care use

Socio-demographic, socio-economic characteristics and health needs		Sample of care users	Classes of care use (%)									X ²
			Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	
Gender	Male	35.7%	36.3	34.2	37.9	43.0*	36.7	34.4	32.1	32.5	43.2*	54.695**
	Female	64.3%	63.7	65.8	62.1	57.0	63.3	65.6	67.9	67.5	56.8	
Age	60-69	26.9%	39.1*	23.0	32.8*	35.7*	15.4	14.2	19.6	23.1	44.9*	874.035**
	70-79	36.0%	37.4	37.1	34.6	38.6	34.1	29.2	34.2	38.6*	36.3	
	80+	37.1%	23.5	39.9*	32.5	25.7	50.5*	56.7*	46.2*	38.3	18.9	
Marital status	Married	56.4%	67.1*	61.5*	44.9	66.8*	45.3	50.6	28.7	51.4	65.0*	1030.139**
	Never married	4.5%	4.7	0.8	9.7*	0.6	6.7*	1.1	19.7*	5.8*	5.8	
	Divorced	4.1%	4.3	2.6	5.6	4.2	4.0	2.2	7.1*	5.0*	7.1*	
	Cohabiting	1.6%	1.9	2.0	1.6	2.0	1.1	0.7	0.2	1.5	2.6	
	Widowed	33.5%	22.0	33.1	38.2*	26.4	43.0*	45.4*	44.3*	36.4*	19.5	
Education	No ed. - prim. ed	45.3%	41.7	49.1*	37.3	45.0	49.6	55.6*	47.2	41.4	33.0	256.776**
	Lower sec. ed.	26.0%	27.0	26.3	26.0	24.6	25.9	26.4	26.4	25.2	24.2	
	Higher sec. ed.	17.0%	18.5	14.8	19.6	19.2	15.1	12.4	14.6	18.6	24.2*	
	Higher ed.	11.7%	12.7	9.8	17.2*	11.3	9.4	5.7	11.8	14.8*	18.5*	
Income	500€-999€	21.0%	17.2	21.4	18.4	14.9	22.5	25.5*	31.1*	23.1*	15.7	281.471**
	1000€-1499€	40.5%	36.3	40.3	38.8	39.8	45.3*	46.9*	42.2	40.7	33.9	
	1500€-1999€	18.8%	21.2*	19.3	21.6	21.9*	16.4	16.2	17.0	16.5	19.2	
	More than 2000€	19.7%	25.3*	19.0	21.2	23.4*	15.8	11.4	9.7	19.7	31.2*	
Need of help for 3 activities	Pers. care, household act., pers. mobility	23.1%	13.3	17.1	9.2	13.2	35.0*	60.6*	30.6*	17.9	8.5	2604.492**

Note. * = standardized residuals greater than |2|; ** = p ≤ 0.001

Discussion

In this paper, we have investigated different types of care use and how socio-economic, socio-demographic characteristics and the care needs of older adults relate to their care utilisation. By using data from the Belgian Ageing Studies (De Donder et al, 2014) and by performing Latent Class Analysis, we created classes of informal and formal care use. We furthermore compared the nine different classes according to their socio-demographic, socio-economic characteristics and their health needs.

The first research question concerned the identification of patterns of care use by community-dwelling older adults. Classically, research about patterns of formal and informal care describes a care mix consisting of three types of care use among older adults: the use of formal care, the use of informal care and/or a combination between formal and informal care use (Broese van Groenou et al, 2016; Gannon et al, 2010). However, this study identified eight different classes of care use among community-dwelling older adults and showed a more diversified and detailed pattern of care combinations. They are delivered by different combinations of a broad range of informal and formal care providers: the nuclear family (partner and/or children) (class 1), the nuclear and extended family (grandchildren and/or other relatives) (class 2), all informal caregivers (class 3), all informal caregivers and the general practitioner (class 4), all informal and formal care providers (class 5), the nuclear and extended family in combination with all formal care providers (class 6), all formal care providers (class 7) and formal home assistance (homecare services, cleaning services, grocery services, chores services, senior companion services, hot meals and/or day care/short term care) (class 8). This is in accordance with recent research indicating the existence of mixed care networks of community-dwelling older adults (Broese van Groenou et al, 2016; Hlebec, 2015; Hlebec and Flipovic Hrast, 2016). Nevertheless, there are some national particularities: Haberkern and Szydlik (2010) discovered that older adults use formal care services more frequently in northern European countries, because intergenerational care is less prevalent than in southern and central European countries. There are also other societal conditions that determine older adults' care use: older adults are more likely to receive only formal home care or a combination of formal and informal care in countries with more extensive welfare state arrangements (national health insurance, higher pensions, etc.) (Suanet et al, 2012). Looking at the Belgian welfare system in particular, on the one hand, nursing and personal care, both in residential care facilities and at home, are largely part of the public healthcare system, which combines universal coverage with relatively low rates of out-of-pocket payment. On the other hand, the availability of home help, which is organised and subsidised by the regional authorities, is limited through yearly quotas (Geerts and Van den Bosch, 2011). Although the contribution made by informal caregivers has declined slightly in the last few decades, it is still, and by far, the biggest source of help for the

elderly in Belgium (De Koker et al, 2007). Nevertheless, recent research about Belgium reports increasing transitions from informal care to formal care (Geerts and Van den Bosch, 2011). Based on our data, we found strong usage of both formal and informal care with a wide range of combinations in between.

The second research question addressed the relation between socio-demographic, socio-economic characteristics and care needs on the one hand; and types of care use on the other hand in order to have a better scope for preventive health initiatives among community-dwelling older adults. This study shows that older people who were receiving help from their nuclear family (class 1) or extended family (class 2) were more often married. Older people who were receiving only formal care (class 7 and 8) more often had no partner (i.e. never married, widowed or divorced). Broese van Groenou et al (2006) clearly report that marital status influences the use and availability of informal help. On the other hand, we noticed that when people used a combination of informal and formal care (class 5 and 6) or intensive formal care (class 7), they were more often older (80+) and in need of help for personal care, household activities and personal mobility. This is in line with research indicating that the amount and frequency of care use increases with age (Byrne et al, 2009; Regueras et al, 2014).

Older adults who received informal care from the nuclear family or a combination of informal care with the general practitioner more often had higher household income. Older adults who received different forms of formal care and less informal care more often had the lowest incomes (500-999€). Older adults within the class of people receiving care from family caregivers (both nuclear and extended) (class 2) or in the class that combines care from family (both nuclear and extended) with care from all formal care providers (class 6) were more often uneducated or had only primary education. This contradicts existing research from Broese van Groenou et al (2006) which found that low socio-economic status impedes the access and use of formal care. A possible explanation can be found in the very accessible and widespread Belgian system of healthcare and social security with low income-related patient contributions (White paper on access to care in Belgium, RIZIV 2014). The group of older adults that indicated they were in need of care or support but were not receiving it from anyone (class 9) were more often married people aged 60-69 years old, who had a high education and a high monthly household income (+2000€).

Limitations and future research

This analysis in this paper has some limitations. Although this research indicates that older care recipients can receive care and support from a broad range of both formal and informal care providers, it is not clear which caregiver or intervention contributes the most to their ability of self-manage or delays the institutionalisation of community-dwelling older people. Recently, research has been conducted examining the effectiveness of home care interventions for frail older people (de Almeida Mello et al, 2016; Van Durme et al, 2015). Further research could explore the effectiveness of informal and formal care interventions within the different classes of care use. A second limitation can be found in the origin of the data sample. However, all included individuals were older people who received some form of help or assistance or who indicated that they were in need of care and assistance, but did not receive it; there was no comparison made with their level of frailty. Research indicates that some socio-economic or socio-demographic characteristics are risk characteristics for frailty (for example increased age, having no partner, lower educational level, lower income) (Dury et al, 2016). It would be interesting to identify highly frail people within the different classes, to customise care and support at the right time and tackle unmet needs. Third, due to the cross-sectional nature of the data, it is not possible to make causal statements about the relationship (Field, 2009). For that reason, we cannot determine whether some socio-economic and socio-demographic characteristics influence the care use classes or vice versa (despite gender and age). Future research could provide evidence related to the temporality of these relationships. And finally, a more qualitative approach could be useful to enhance understanding of the mechanisms and reasons behind the care use of older adults. This will form the topic of a subsequent paper.

Conclusion and policy implications

Several types of formal and informal care use can be identified within our data, with a broad range of formal and informal care providers involved. This study gives insight into the complexity of the care mix among community-dwelling older adults. This study also indicates that there are still a certain number of older people who indicated they were in need of care and support, but did not receive it from anyone. A remarkable feature is that this group of people do not seem to have a low socio-economic status. People who used formal care or all possible caregivers were more often older, while people who were using informal caregivers were more likely to be younger. Older people who benefited from informal care were more often higher educated and had a higher monthly household income, while older adults who only received different forms of formal care more often had the lowest incomes. It seems that social capital goes with economic capital among older people. There is some

evidence that a good education leads to better paid occupations and thus to more wealth and better pensions in later life (Bosma et al, 1999; Grundy and Slogett, 2002). Research by Chapell and Blandford (1991) has already stated that in the first instance older people use their informal network to deal with their care needs and then progressively use formal care as they become older, face higher needs or when an informal network is lacking. Habib et al (1993) also came to the conclusion that when older people live alone, the formal system replaces the family. Socio-economic characteristics (level of education and income) have no significant relation with the access and use of formal care. This emphasises the fact that Belgium has a high-performing and accessible healthcare system. Although people with lower monthly household incomes do not experience barriers in accessing formal care, they seem to lack informal care and support. This emphasises that case-finding is extremely important to ensure interventions target older people with defined care needs and to identify those people lacking care and support. Community-centered care, recognizing different access to formal and informal resources, might provide an answer to that.

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