ORIGINAL INVESTIGATION

Forgone health care due to cost among older adults in European countries and in Israel

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Abstract This study sought to identify the principal factors that predict forgone health care due to cost among European and Israeli older adults. The analysis applied the Andersen–Newman model of health service utilization to data from the first wave of the Survey of Health, Ageing and Retirement in Europe ($n = 28,849$). Relinquished health care was regressed on the predisposing characteristics, need factors and economic access attributes of the respondents, in general, and in each of 12 countries, in particular. The results showed that forgone health care due to cost occurs among a substantial minority of older adults. Moreover, relinquished care is associated with younger old age, greater health needs and perceived economic inadequacy. Although statistically significant in certain cases, country of residence does not constitute a robust predictor of health care relinquishment. Social policy should address the antecedents of forgone health care in order to more effectively meet the health needs of the older population.

Keywords SHARE · Underutilization · Health services · Economic access · Perceived income adequacy · Out-of-pocket expenses

Introduction

Timely receipt of health care contributes to both greater longevity and to better quality of life in old age. Nevertheless, a substantial minority of older people forgo health care for a variety of reasons. For some, needed health care may not be accessible due to logistical constraints or eligibility requirements for the receipt of services. Others may purposively choose to go without care in order to avoid stressful treatments, or to shorten the length of terminal illnesses. A third major source of forgone health care is financial. That is, people who need or desire health-related care services may abstain from receiving them due to cost considerations.

The inquiry that is spelled out in this article focuses on this latter group, those who forgo health care because of its cost. The study seeks to identify the principal factors that limit the financial access to health care among older adults in European countries and in Israel. Clarification of such restraining factors is important because it can contribute to the development of policies and strategies aimed at reducing the problem. Targeted intervention in this regard should be able to diminish the extent of health care that is relinquished by older people due to cost concerns, and in turn, to improve their quality of life.

The current analysis is based conceptually on the Andersen–Newman model of health care utilization (Andersen and Newman 1973; Andersen 1995). It employs a version of the model that was recently applied in a study of disparities in the use of health care services among older persons in the United States (Dunlop et al. 2002). Three main categories of predictor variables are examined in relation to forgone health care: predisposing variables, health needs and economic access.

The present study uses data from the first wave of the Survey of Health, Ageing and Retirement in Europe which was executed in 2004/2005 in 11 European countries (Börsch-Supan et al. 2005), and in 2005/2006 in Israel (Litwin 2009). The wide range of variables that are addressed in SHARE provides an unparalleled opportunity to examine the correlates of forgone health care. As such, this inquiry constitutes a unique addition to the literature on

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health care utilization among older people in Europe (Heslin et al. 2001; Peytremann-Bridevaux et al. 2008).

Health care forgone because of cost

Study of the financial antecedents of forgone health care derives from the larger field of health care utilization. A variety of terms has been used to capture the phenomenon, including cost-related medical nonadherence (Bambauer et al. 2007), forgone care (Elofsson et al. 1998), under-utilization or underuse (Asch et al. 2000; Hartert et al., 2000; Piette et al. 2004b), and cost barriers (Okoro et al. 2005). The respective relevance of these terms to the current inquiry is in their application to situations in which people relinquish health-related care due to cost considerations.

Andersen and Newman (1973) set the overall conceptual framework for the analysis of health care utilization. They maintained that service utilization is variously shaped by: (1) the predisposing characteristics of the user, such as age or gender, (2) need factors which reflect the immediate grounds for seeking service, in this case symptoms or ill-ness, and (3) enabling characteristics that promote one's access to services, such as human and social capital. Dunlop and associates have recently applied this conceptualization, focusing on economic access as the principal area of interest among the enabling variables. As such, their modified model is particularly suited for the investigation of cost-related forgone care. They measured economic access as "an individual's level of human capital and the financial ability to pay for medical care" (Dunlop et al. 2002, S224).

The literature on health service utilization among older adults reveals that utilization rates vary according to the type of service in question. One major area in which underutilization is reported is in the use of medications (Chrischilles et al. 1992; Piette et al. 2006). Older people may fail to fill prescriptions or may delay refilling them, skip doses or take smaller doses over longer periods of time (Pierre-Jacques et al. 2008). Moreover, financial considerations tend to dominate forgone medications (Elliott et al. 2007; Piette et al. 2004a). In addition, lack of knowledge about drug coverage is associated with cutting back on medications due to cost pressures (Piette and Heisler 2006). A study of cost-related medication nonadherence among elderly people in the United States showed that while there was a small decrease in forgone medication after the implementation of Medicare prescription drug coverage (Part D), this was not the case among the sickest (Madden et al. 2008). Interestingly, a study of chronically ill older adults found that few of the patients had been asked about cost-related medication problems by their physicians (Heisler et al. 2004).

Another area of health care in which underutilization by older adults has been noted is dental care (Brothwell et al. 2008; Marino et al. 2007). Socioeconomic barriers to receiving dental care have been well documented (Dolan et al. 1998), particularly one's difficulty in meeting the costs of such care (Macek et al. 2004). A study of predictors of dental care use by elders over a 10-year period in Massachusetts showed, for example, that dentate status, education, and income were all significant predictors (Gilbert et al. 1990). Similarly, data from the 1990 Health Supplements to the Panel Study of Income Dynamics in the United States found that those with better education and greater financial resources were more likely to use dental services. In addition, it seems that people lacking a separate dental insurance policy made lesser use (Kington et al. 1995).

The influence of insurance coverage on health care utilization has also been demonstrated by data from the 2002 wave of the American Health and Retirement Study (Xu et al. 2006). The study examined physician visits, hospital stays, dental visits and the use of prescription medication among women aged 55–64. Multivariate analyses revealed that women who had coverage for a particular service were significantly more likely to have used that service when compared to women without such coverage. Stated differently, the findings suggest that lack of coverage may be associated with forgone health care. Indeed, a study of low income Medicare beneficiaries in the United States found that out-of-pocket health care spending remained a substantial burden for most of that population (Gross et al. 1999).

The literature on health service utilization among older adults also examines other services, particularly physician visits, emergency department visits and overnight hospital stays (Bazargan et al. 1998; Kassab et al. 1996; Walter-Ginzburg et al. 2001; Xu et al. 2006). However, there may be less of an association between cost considerations and utilization in these cases (Miltiades and Wu 2008; Rust et al. 2008). A Canadian study found, in addition, that utilization of mental health services was negatively related to age among older adults with depression (Crabb and Hunsley 2006). Another study found that older men were less likely than older women to seek professional psychological help (Mackenzie et al. 2006). However, cost considerations were apparently secondary in these cases. Finally, underuse of angiography has been found to be associated with gender and race as well as with clinical characteristics, but it did not seem to be associated with perceived financial constraints (Garg et al. 2002).

In sum, this review of the literature has shown that there is relatively little written on the phenomenon of forgone health care due to cost among older adults, even though it appears to be a problem. Moreover, no study that

systematically examines the predictors of the phenomenon has been found. Rather, inference must be drawn from more general studies on health service utilization among elderly people. The review also reveals that most of the literature on health service utilization by older adults comes from the United States. Analysis of this topic in the European context is, therefore, timely and relevant.

The current state of the literature does not allow the formal construction of hypotheses regarding forgone health care due to cost. However, drawing upon the Andersen–Newman model we can formulate a number of research questions. First, are predisposing characteristics of older people, and particularly the variable of age, associated with forgone health care due to cost? Second, do need factors correlate with the relinquishment of health care for financial reasons, and in particular, one's health state? Third, assuming that economic access is a key correlate of the propensity to forgo health care due to cost, what is the most significant economic predictor of forgone care among the respective measures of economic access? Finally, is the Andersen–Newman model useful to predict forgone health care in different countries?

Data and methods

As noted, this study was based upon data from the first wave of the Survey of Health, Ageing and Retirement in Europe, an empirical enterprise that gathers a wide range of information from representative samples of the community-dwelling older population. The current analytical sample comprised respondents aged 50 and older from the 12 SHARE countries that participated in the first wave. In SHARE, as in the Health and Retirement Study and the English Longitudinal Study of Ageing, all age-eligible household members (and their spouses of any age) are interviewed. As shown in Table 1, Wave 1 of SHARE obtained an overall household response rate of 62%, ranging from almost 40% in Belgium and Switzerland, to 81% in France. The average within household response rate (i.e., the ratio between the number of responding individuals and the number of eligible persons in these households) was 85%, and ranged from over 70% in Spain to over 90% in Denmark, Belgium, France and Greece.

Respondents with missing values on one or more of the measures were excluded from the current analysis. The resultant sample numbered 28,849 individuals (92.7% of the total number of observations), with country effective sample size ranging from a bit under 1,000 respondents in Switzerland, and about 1,600–1,700 respondents in Denmark and Austria, to well over 2,000 interviewees in all the other 9 countries. We also note that in SHARE, as in similar studies of middle and older aged adults elsewhere

Table 1 Forgone health care due to cost by country, response rates and sample sizes

Country	Forgone care (weighted %)	Response rates		Effective sample size
		Household	Within household	
AT	3.0	55.6	87.5	1,755
BE	3.9	39.2	90.5	3,548
CH	3.7	38.8	86.9	931
DE	6.0	63.4	86.2	2,789
DK	1.6	63.2	93.0	1,582
ES	3.5	53.0	73.7	2,222
FR	6.0	81.0	93.3	2,960
GR	5.7	63.1	91.8	2,687
IL	14.2	68.1	83.9	2,409
IT	4.9	54.5	79.7	2,373
NL	2.5	61.6	87.8	2,762
SE	3.3	46.9	84.6	2,831
Average/total	5.1	61.8	85.3	28,849

Source: http://www.share-project.org/t3/share/index.php?id=97

(Banks et al. 2002; Burkhauser and Gertler 1995), each household designates one eligible household member as its financial informant. In order to allow data analysis on the individual level, household data provided by the financial informant was assigned to the spouse or partner as well.

Variables

The dependent variable in this analysis was derived from the question "During the last twelve months, did you forgo any types of (health) care because of the costs you would have to pay?" The response categories were 'yes' and 'no'. Respondents who indicated having relinquished any care were then asked to specify the types of care forgone from a list of health services.

The independent variables addressed in the analysis followed from the Andersen–Newman model of health care utilization as applied in the recent study by Dunlop et al. (2002). Accordingly, we looked at predictor variables from three main groups: socio-demographic background (predisposing variables), health status (need variables) and economic access (enabling variables). The socio-demographic group included three variables: age, gender, and family status. 'Age' had four categories (50–59, 60–69, 70–79, and 80 or more years). 'Gender' was a dichotomy (man, woman). 'Family status' reflected the following four situations: unmarried and lives alone, unmarried and lives with children, married, married and lives with children.

The health status measures consisted of six variables. 'ADL' reflected limitations in basic activities of daily living (dressing, bathing, eating, getting in or out of bed,

walking across a room and toileting). 'IADL' counted limitations in instrumental activities of daily living (preparing a hot meal, shopping, making telephone calls, taking medications, housework and managing money). Both of these variables were re-coded as dichotomous indices: no reported difficulty versus one or more reported difficulties. 'Self-perceived health' was measured on a 5-point scale that ranged from very good to very bad. The variable was recoded as a dichotomous measure for use in the current analysis: less than good health versus good or very good health.

Two of the health measures reflected self-reported conditions and symptoms. 'Conditions' were obtained from a list of 14 disease states ever experienced, including hypertension, diabetes, osteoporosis and cancer. 'Symptoms' were obtained from a list of 11 ailments experienced in the previous 6 months, such as chest pain, dizziness, and swollen legs. Responses on these two variables were summed and recoded into three levels: none, 1–2 and 3 or more. Finally, 'depression' was measured on the Euro-D scale, which is based on self-report of 12 depressive symptoms, such as irritability, trouble sleeping and excessive guilt feelings (Castro-Costa et al. 2007). The dichotomous outcome employed in the current analysis reflects a scale score above the clinical cutoff point of three symptoms.

The final block of variables in the model were the enabling characteristics, addressed here in terms of economic access. The variables included educational level and four economic status measures. 'Education' was harmonized for international comparison by re-coding raw-values into UNESCO's International Standard Classification of Education (ISCED-1997). The scale was recoded here into three levels: low, medium and high. 'Income' was based on self-reports of gross individual income from employment, transfers, pensions and other sources (Brugiavini et al. 2005). In accordance with accepted practice, imputations were effected in cases of missing financial data. The resultant sums were standardized by the household-size square root to get the equivalent disposable income per standard person. 'Wealth' was based on the combined values of bank accounts, stock holdings, primary residence and other sources, after the deduction of liabilities (Christelis et al. 2005). The income and wealth variables were both adjusted for purchasing power parity and then recoded into three equal-size groups.

A measure of 'out-of-pocket expenditures on health care' was also employed. This variable was calculated by summing out-of-pocket payments for inpatient care, outpatient care and prescribed drugs, and then dividing the sum by standardized per person household income (in Euros). The measure thus reflects the relative proportion of one's household income that is devoted to health payments

that are not covered by insurance policies and programs. The scores on this variable ranged from 0% to more than 100%, (the latter was relevant for people with few financial resources and many expenses). The respective scores were recoded into three groups: 0%, 1–4.5% and 4.5% or more. Finally, a subjective economic indicator was introduced: "perceived income adequacy". This variable, which reflects the feeling as to whether one's monthly household income is sufficient in order to make ends meet, has recently been found to constitute a robust measure of economic state among older people (Litwin and Sapir 2009). The response scale on this ordinal measure was composed of four categories that ranged from great difficulty to 'easily'. These values were re-coded into a dichotomous variable: reported difficulty in making ends meet versus little or no such difficulty.

Analysis

The analysis proceeded in three stages. First, we considered the univariate description of the dependent and independent variables within each country. The descriptive examination includes the kinds of health care relinquished within each country. Second we employed a multivariate hierarchical logistic regression in order to test the model, controlling for country. In the third and final stage, we employed a series of multivariate logistic regressions within each country in order to further test the applicability of the model.

The statistic presented in the multivariate analyses is the odds ratio (OR), or the exponentiation of the B coefficient. The OR value shows the relative likelihood that respondents with a given characteristic will experience a particular outcome. Thus, in general terms, an OR of 3.0 would imply that respondents in this category are three times as likely to forgo care as respondents in the reference category. An OR of less than 1.0 reflects a lower likelihood of forgone care. Thus, an OR of 0.5 would indicate that respondents are twice *less* likely to forgo care (1/0.5 = 2).

Results

Table 1 shows the frequency of forgone health care due to cost by country, weighted for age and gender. Israel leads the rate of forgone care with 14% of its older population having relinquished such care in the previous 12 months, followed by France, Germany and Greece (about 6%). In the remaining eight countries less than 5% of the older population forwent such care. Additional analysis (not shown here) revealed that dental care was the health service most frequently forgone in all of the countries. Medications were the type of care relinquished next most often

Table 2 Univariate description of study variables by country: weighted percentages, (averages), and [medians]

Variables	AT	BE	CH	DK	DE	ES	FR	GR	IL	IT	NL	SE
Predisposing												
Age	(65.31)	(64.05)	(63.75)	(63.34)	(63.34)	(66.01)	(63.65)	(63.33)	(65.81)	(63.92)	(62.70)	(64.09)
Gender (men)	42.10	46.47	47.35	46.41	46.88	42.14	44.45	46.86	45.67	44.98	47.17	47.14
Unmarried alone	33.87	23.50	27.08	32.27	30.19	24.90	27.34	26.68	17.08	24.76	27.55	33.85
Unmarried/children	4.95	4.01	4.14	1.60	3.87	10.20	3.97	6.93	9.47	8.74	3.05	2.78
Married	52.15	61.03	56.26	58.80	57.58	40.44	58.37	46.71	49.20	43.55	57.33	54.97
Married/children	9.03	11.46	12.52	7.33	8.36	24.46	10.32	19.68	24.25	22.94	12.07	8.40
Need												
ADL	(1.24)	(0.73)	(0.10)	(0.78)	(0.51)	(0.32)	(2.13)	(0.53)	(0.69)	(0.24)	(0.83)	(1.82)
IADL	(1.41)	(0.87)	(0.15)	(0.96)	(0.60)	(0.56)	(2.28)	(0.70)	(0.92)	(0.35)	(0.94)	(1.94)
SPH < good	39.27	31.00	19.28	30.79	43.82	49.89	37.44	35.48	48.82	50.49	30.52	35.21
Conditions	(1.24)	(2.14)	(1.06)	(2.73)	(2.11)	(2.28)	(3.11)	(1.72)	(2.22)	(6.37)	(2.27)	(3.47)
Symptoms	(1.31)	(1.77)	(1.01)	(2.07)	(1.49)	(1.95)	(2.84)	(1.62)	(2.50)	(1.98)	(1.84)	(3.54)
Depression	(1.96)	(2.32)	(1.88)	(1.83)	(1.89)	(3.15)	(2.79)	(2.17)	(2.93)	(2.84)	(1.96)	(1.98)
Economic access												
Low education	(31.41)	(50.83)	(52.37)	(25.01)	(17.82)	(85.33)	(53.23)	(59.97)	(24.90)	(77.45)	(57.06)	(52.36)
Med education	(45.68)	(25.95)	(21.96)	(43.36)	(54.73)	(7.54)	(28.02)	(23.27)	(55.64)	(15.23)	(23.17)	(18.18)
High education	(22.92)	(23.22)	(25.67)	(31.62)	(27.45)	(7.12)	(18.75)	(16.76)	(19.46)	(7.32)	(19.76)	(29.46)
Income (€)	[1,695]	[1,551]	[2,427]	[2,259]	[1,779]	[827]	[1,728]	[863]	[820]	[1,204]	[2,160]	[2,080]
Wealth (*1,000€)	[96.5]	[158.5]	[180.8]	[112.4]	[90.4]	[113.3]	[143.8]	[90]	[82]	[115.7]	[104.4]	[79.5]
Out-of-pocket	(6.62)	(6.01)	(5.26)	(4.13)	(1.33)	(5.66)	(0.31)	(7.75)	(5.15)	(12.42)	(2.16)	(1.65)
Income inadequacy	26.67	30.03	18.33	26.68	19.36	56.86	33.55	70.74	57.43	64.42	21.31	23.88

in about half of the countries, and in the other half, specialist physician services. Forgone visits to general practitioners were relatively rare, except in Greece.

Table 2 shows the weighted univariate distribution of the independent variables by country. In order to obtain representative distributions of the data, we applied weights that were calculated through calibration to known population totals, namely, national population by age group and gender. Looking first at the predisposing variables, it can be seen that the average age ranged from 63 to 66 years. (We note also that persons aged 80 years or over comprised about 9% of the country samples, on average). As for gender, men comprised 42–47% of the respective country populations. The third predisposing variable, family status, varied considerably across countries. People living with a spouse (with or without children in the household) accounted for a bit over 60% of the older population in Austria, but over 70% in Israel. People living with their children in the same household, whether with a spouse or not, accounted for a bit less than 9% of the Danish population, and a quarter to a third of the Mediterranean populations (Spain, Italy, Greece and Israel).

Turning to the health status variables, which reflect respondents' needs, one can discern geographical differences: residents of France, Italy and Israel reported worse health status in three of the six variables, while residents of Switzerland reported the best health status in these measures. The Spanish, Israeli, Italian and French respondents also showed a greater number of depressive symptoms, on average.

Looking at the economic access variables, it can be seen that education varied considerably. A quarter or more of the population in Denmark, Sweden, Germany and Switzerland had high education, but less than 8% in Italy and Spain. As for income distribution, geographical differences emerge. The average Swiss, Danish, Dutch and Swedish incomes were highest, over 2,000€ per month, followed by French, German, and Austrian incomes of about 1,700€ per month. Israeli, Spanish and Greek averages were lowest, less than 900€ per month. Household wealth was highest on average in Switzerland, Belgium and France and lowest in Sweden, Israel, Greece, Germany and Austria.

Examining the income share devoted to health services not covered by insurance policies, we note that the Greek respondents reported spending almost 8% of their disposable income on out-of-pocket funded health services, compared to only about 1% or less in Germany and in France. The bottom row in Table 2 documents average perceived income adequacy, by country. Most of the older populations in Greece, Israel, Italy and Spain considered their household incomes as inadequate to make ends meet. In contrast, less than a quarter of the Dutch, Swedish,

German and Swiss populations viewed their incomes as inadequate.

Bivariate associations between the predictor variables and forgone health care due to cost, by country, were also examined (but are not detailed here). The results revealed that all of the variables were associated with the outcome in at least some of the countries. Consequently, all were included in the subsequent multivariate analyses. Table 3 presents the net association between the independent variables and health care relinquishment in two steps. First, the net effect of each of the predisposing, need and enabling characteristics on the outcome variable are assessed. Next the model is repeated, controlling for country dummies. The reference category employed for this variable was Belgium, insofar as the rate of cost-related health care underutilization in that country was very close to the overall sample average.

The results reveal that Andersen's model, as applied in this investigation, is a valid model in that variables from all three domains jointly increase the likelihood of forgone care. Among the predisposing variables, respondents' age was the most significant characteristic, inversely associated with health care underutilization due to cost. The age effect on the outcome variable was the same even after controlling for country of residence. In addition, people living with their spouse were found to be slightly less likely to forgo care due to cost, though this did not characterize respondents who lived with spouse and children in the same household. Lastly, the gender variable, which had been close to reaching significance in model 1, obtained significance after accounting for country of residence in model 2. As is shown, men were more likely to forgo care than women.

Turning to the need factors, we note that all variables except the number of conditions from which the client suffers were found to constitute predictors of cost-related forgone health care. Clinical depression had slightly stronger predictive power, when compared to the other health indicators, but it weakened a bit after the entry of country of residence into the analysis.

Looking at the economic access variables, we note that respondents' perceived income adequacy was the strongest predictor of health care relinquishment. Financially distressed people were much more likely to forgo health care due to its cost than the financially non-distressed. Additionally, low wealth level was associated with forgone care, all things considered. Low education also showed an association with the outcome variable in model 1, but its effect disappeared after taking country of residence into account.

As noted above, model 2 added respondents' country of residence. The results of the expanded regression show that except in the case of two variables, the addition of the country variable did not meaningfully change the predictors' odds ratios. The exceptions were gender, which gained significance in the second model, and low education, which lost its earlier significance in predicting the

Table 3 Likelihood of forgone health care due to cost: hierarchical logistic regression (odds ratios)

Variables	Categories	Model 1	Model 2
Predisposing			
Age[a]	60–69	0.79*	0.77*
	70–79	0.58***	0.55***
	80+	0.44***	0.41***
Gender[b]	Men	1.12	1.14*
Family	Unmarried/children	1.03	0.97
Status[c]	Married	0.83**	0.78***
	Married/children	1.19	1.24
Need			
ADL[d]	>0	1.40***	1.44***
IADL[d]	>0	1.36***	1.31***
SPH[e]	<Good	1.41***	1.39***
Conditions[f]	1–2	1.04	1.06
	3+	1.04	1.06
Symptoms[f]	1–2	1.64***	1.72***
	3+	1.98***	2.11***
Depression[g]	>3	2.11***	2.02***
Economic access			
Education[h]	Low	1.41***	1.15
	Med	0.98	0.91
Income[h]	Low	0.95	0.92
	Med	0.97	0.94
Wealth[h]	Low	1.29***	1.28**
	Med	0.95	0.95
Out-of-pocket[i]	0.5–4.5	1.10	1.14
	>4.5	1.53***	1.51***
Income inadequacy[j]	Yes	3.63***	3.23***
Country[k]	AT		0.97
	DE		1.90***
	SE		0.95
	NL		0.89
	ES		0.60**
	IT		0.98
	FR		2.18***
	DK		0.50**
	GR		1.39*
	CH		1.63*
	IL		2.96***
Pseudo R^2		0.160	0.189

* $P < 0.05$; ** $P < 0.01$, *** $P < 0.001$

Reference categories: [a] 50–59, [b] Women, [c] Unmarried alone, [d] None, [e] Good/very good, [f] None, [g] 0–2, [h] High, [i] <0.50, [j] No, [k] Belgium

outcome variable. More importantly, model 2 added only a small amount to the explained variance.

Looking at the specific country differences in Table 3, we note that the likelihood to relinquish health care due to cost in Austria, Sweden, the Netherlands and Italy was not significantly different than the same in Belgium. On the other hand, Danish and Spanish respondents were less likely to forgo care and Israeli, French, German, Swiss and Greek respondents were more likely to relinquish care for financial reasons. As noted, however, these differences added only a modest degree of explanatory power to that explained by the conceptual model.

In the final stage of the analysis, we tested the applicability of the model in each of the dozen countries under consideration. The model's predictability, as indicated by the pseudo R^2, ranged from 0.12 to 0.35 in the respective countries. It predicted the outcome variable best in Denmark and Belgium, and least in France and Germany.

Looking at the results by country, it appears that the age variable was the strongest predictor in Sweden and Spain. Health symptoms were the strongest predictors in Austria and Denmark. Economic access variables were the strongest predictors in eight countries: low income in Switzerland, out-of-pocket expenses in the Netherlands, and perceived income inadequacy in the remaining six countries. Interestingly, the pseudo R^2 was aligned with the perceived income adequacy's net power to predict forgoing care due to cost (Table 4).

Table 4 Likelihood of forgone health care due to cost by country: logistic regression (odds ratios)

Variables	Categories	AT	BE	CH	DE	DK	ES	FR	GR	IL	IT	NL	SE
Predisposing													
Age[a]	60–69	0.60	0.71	0.87	0.76	0.60	0.41*	0.79	0.68	0.79	1.04	0.46*	0.66
	70–79	0.46	0.44**	0.53	0.70	0.33	0.33**	0.50**	0.28***	0.59**	0.60	0.67	0.30**
	80+	0.46	0.28**	0.28	0.76	0.46	0.33*	0.31**	0.26***	0.52*	0.27**	0.73	0.11**
Gender[b]	Men	1.22	0.60*	1.26	1.15	0.88	0.84	1.01	0.82	0.83	1.09	0.65	1.24
Family	Unmarried/ children	1.36	0.47	1.62	1.28	0.00	1.16	1.47	0.77	1.13	2.30*	1.03	2.08
Status[c]	Married	0.78	0.73	0.52	0.85	0.88	0.68	0.97	0.82	0.76	1.80	0.81	0.66
	Married/ children	2.23	0.69	0.24	1.43	0.00	0.81	1.43	0.75	1.46	1.38	0.75	0.73
Need													
ADL[d]	>0	1.04	1.01	0.71	0.89	2.42	2.43*	1.12	2.46**	0.95	1.21	1.68	1.20
IADL[d]	>0	1.95	2.16**	2.58	1.37	0.49	1.00	1.04	0.77	1.42	1.29	1.13	0.72
SPH[e]	<Good	1.24	1.26	1.43	1.24	0.90	1.20	0.81	1.21	1.64**	1.85*	1.75	1.25
Conditions[f]	1–2	0.75	1.06	0.78	1.34	0.46	0.63	1.07	1.24	1.13	0.76	1.11	0.67
	3+	0.81	1.78	1.90	1.34	1.08	0.94	1.10	1.77	1.27	0.87	1.94	0.90
Symptoms[f]	1–2	3.27**	2.26**	0.90	1.26	6.81*	1.66	1.67*	2.12**	0.91	2.12*	1.06	1.82*
	3+	3.56*	1.60	0.95	1.86*	12.56**	2.25	2.08**	1.70	0.92	3.59***	1.45	2.67*
Depression[g]	>3	1.95	2.39***	3.06**	1.58*	1.66	2.32*	1.83***	3.18***	2.02***	1.50	1.62	1.14
Economic access													
Education[h]	Low	0.50	0.72	0.69	1.18	1.20	0.53	0.71	1.01	1.36	0.60	0.93	0.43**
	Med	0.39*	0.91	0.92	0.95	1.90	0.42	0.67	0.93	1.19	0.76	0.88	0.96
Income[h]	Low	0.77	1.61	0.29*	0.71	1.80	0.76	1.14	0.83	0.89	0.84	0.28**	0.84
	Med	0.48	0.97	0.41	0.99	1.04	1.60	1.28	0.90	0.87	0.66	0.90	0.99
Wealth[h]	Low	0.73	1.64	2.17	1.44	3.69	0.98	1.26	0.93	0.83	2.05**	1.92	1.86
	Med	1.74	1.00	2.09	1.43	1.93	0.95	0.63*	0.56*	1.02	0.95	1.75	0.50
Out-of-pocket[i]	0.5–4.5	1.23	1.72*	0.72	1.75**	1.16	0.98	1.74**	1.33	1.12	1.31	1.45	1.22
	>4.5	1.57	0.80	1.04	2.47**	0.66	1.77	1.45	2.84***	1.91**	2.14**	3.09*	2.05
Income inadequacy	Yes	2.79**	5.38***	2.40	2.64***	8.35***	2.47**	2.82**	6.12***	3.12***	4.31***	2.50**	3.40***
Pseudo R^2		0.19	0.27	0.18	0.13	0.35	0.15	0.14	0.24	0.18	0.22	0.17	0.20

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Reference categories: [a] 50–59, [b] Women, [c] Unmarried alone, [d] None, [e] Good/very good, [f] None, [g] 0–2, [h] High, [i] <0.50, [j] No

Discussion

The aim of this analysis was to examine forgone health care due to cost considerations among older people. The study applied a modified version of the Andersen–Newman model of health service utilization to the data from SHARE, the Survey of Health, Ageing and Retirement in Europe. Eleven European countries and Israel were the focus of the current investigation. The inquiry revealed that relinquishment of care due to cost in the 12 months preceding the survey ranged from some 3–6% in European countries, to 14% in Israel. The health service most frequently forgone was dental care, followed by medications and visits to specialists. Relinquishment of these types of care due to cost has also been reported elsewhere (Elliott et al. 2007; Macek et al. 2004; Marino et al. 2007; Piette et al. 2004a).

The first research question asked whether predisposing characteristics are associated with forgone health care due to cost. The results of the analysis showed that age was indeed a predictor. That is, young-old persons were more likely to forgo care than the old-old, all else considered. This is significant because forgone care in early old age can lead to complications that may subsequently compromise the quality of later life. We were not able to directly examine why the young old relinquished health care more frequently than the older old did. But, it could be that persons aged 50–69 are more obliged to financially assist their children (Litwin et al. 2008), and may forgo their own care in order to do so. Whatever the reason, forgone care in early old age generates increased health costs later on, and should be addressed as a problem that social policy needs to address.

The second research question examined the association between need factors and the relinquishment of health care for financial reasons, looking particularly at the effect of health. The results of the investigation confirmed that the number of symptoms was indeed related to forgone care after taking into account the effect of the other study variables. Moreover, the effect of symptoms was stronger than the effect of age in predicting the likelihood of forgone care due to cost. Other health measures were also related to relinquishment of care, to a lesser degree. There are several possible explanations for this phenomenon. First, sicker people need more care and hence have greater opportunity to relinquish at least some of the prescribed treatments. Second, it could be that people who require several treatments tend to prioritize them and to purchase the ones deemed the most important. A third possibility is that health interacts with other need factors known to restrain health care utilization, such as depression. Indeed, the current study found an association of similar magnitude between depression and forgone care due to cost. However,

this association weakened in the separate analyses by country, and depressive symptoms did not remain predictors of health care relinquishment in the Scandinavian countries, the Netherlands and Italy.

The third research question asked which of the economic predictors of forgone care is the most significant. The analysis revealed that perceived income adequacy was the dominant factor. That is, a perception that one's household income is insufficient to make ends meet emerged as the main predictor of relinquished health care due to cost in most countries. This finding suggests that subjective estimations of economic capacity govern the extent to which older people utilize health services for which they must pay. Although individual evaluations of financial capacity are indeed rooted in objective measures of income and wealth, they are also fueled by one's expectations concerning the future (Litwin and Sapir 2009). Thus, financial uncertainty may lead to underutilization of health services which, in turn, may lead to poorer health state, increased health expenses and further economic distress.

We should point out that a complementary analysis, not presented here, considered the effect of respondents' labor-force participation on forgone care due to cost. It seemed plausible that unemployed or disabled persons might relinquish purchase of health services to a greater degree because of work-related financial uncertainty. The results showed that work status was indeed correlated with the outcome variable at the bivariate level. However, it did not have a net significant effect on health care relinquishment after controlling for the other enabling factors.

The current analysis showed that out-of-pocket health expenses were also significant in predicting forgone care due to cost. This measure reflects a lack of insurance coverage or a limited degree of the same. The literature shows that health insurance enhances utilization and reduces the relinquishment of health care (Gross et al. 1999; Xu et al. 2006). Targeted expansion of such coverage would seem to be a means to reduce forgone care that may engender greater future expenses.

Finally, the study queried whether there are country differences in forgone health care among older people in European countries and in Israel. Some differences were observed, and these added 2.9 percentile points to the explained variance. The differences were seen in Germany, France and Israel, where after controlling for everything else, respondents were two to three times more likely to relinquish health care services, when compared to the reference country, Belgium. In Denmark and Spain, on the other hand, respondents were about twice less likely to forgo care due to cost, all else considered.

However, country differences are less important than the combined effect of predisposing characteristics, need

factors and economic access in predicting older clients' health services underutilization due to cost barriers. Stated differently, application of the Andersen–Newman model of health care utilization to forgone health care due to financial considerations, as was done in this study, reveals that clients' predisposing, need and enabling characteristics are the main antecedents of such decisions. The country in which one lives contributes less to the explanation of relinquished care.

One limitation of the current study is its cross-sectional design. This follows from the fact that the analysis is drawn upon a single wave of SHARE. Longitudinal data can more effectively trace the effects of changes in predictor variables on changes in forgone care. Such inquiry will be possible in the future, with collection of additional waves of SHARE data. A second limitation of the analysis is the aggregation of the forgone care variable. Respondents were asked whether they had forgone any health care due to cost. As such, we did not trace whether specific insurance coverage was related to forgone care in the same area, as, for example, dental care. This is not a serious limitation, however, in that lack of coverage for certain needs (and the concomitant out-of-pocket expenses) may lead to relinquished care in other areas as well.

A third limitation lies in our use of dichotomized variables to measure certain need factors such as self-perceived health and depression. It could be argued that limiting the investigation to this level of measurement might overlook valuable information, and that the differences in the need circumstances of older adults should be addressed in greater detail. We preferred to employ dichotomies in these selected variables, since our purpose was to identify the main characteristics that are associated with older adults' decisions to relinquish health care. We did so by dividing the respondents on these variables into those who were characterized by the given quality and those who were not. Nevertheless, future investigations should address other levels of measurement regarding these particular predictor variables.

In sum, this study demonstrates that forgone health care due to cost occurs among a significant minority of older adults. Moreover, relinquished care is associated in most countries with younger old age, greater health needs and perceived economic inadequacy. As such, it should be possible to refine existing health care policy in ways that are aimed to modify these antecedents of forgone care. This study identifies specific areas that need to be addressed in order to achieve this policy goal.

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