

# The Longitudinal Relationship Between the Use of Long-Term Care and Depressive Symptoms in Older Adults

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**Purpose:** The aim of this study was to estimate the longitudinal relationship between transitions in the use of long-term care and older adults' depressive symptoms and to investigate whether this relationship could be explained by markers of older adults' underlying health, or other variables including demographics, personality, and partner status. **Design and Methods:** Data were from the Longitudinal Aging Study Amsterdam, which consists of a random, community-based sample of 3,107 older Dutch people (55–85 years of age) stratified by age and gender. The use of informal care, professional home care, and institutional care was recorded, and respondents were screened on depressive symptoms. Follow-up measurements took place at 3 and 6 years. **Results:** Longitudinal analyses showed significant associations between the enduring use of professional long-term care and an increase in depressive symptoms. Transitions to professional home care or institutional care were also associated with considerably more depressive symptoms after 3 years, whereas transitions from professional home care or institutional care to no care or informal care only were not associated with a change in depressive symptoms. Most of the associations remained significant after indicators of

underlying health and other covariates were adjusted for, and also after the data were reanalyzed for respondents with and without functional limitations. **Implications:** This study does not involve a controlled experiment of professional long-term care among older adults. However, the findings suggest the possibility that receiving professional long-term care could introduce new stressors and increase the risk of depressive symptoms. Our analyses illuminate the concerns of elders regarding their use of professional long-term care and may help in planning for more effective delivery of this type of care.

*Key Words:* Health services, Nursing homes, Home care, Aged, Community

Depression is a common symptom in later life and has enormous impact on both public health and the use of health services (Beekman, Copeland, & Prince, 1999; Beekman et al., 2002; Blazer, 1994; Copeland et al., 1992; Gurland, 1992; Penninx, Geerlings, et al., 1999; Penninx, Leveille, Ferruci, van Eijk, & Guralnik, 1999). Several studies have shown the unique impact of older adults' depressive symptoms on the use and cost of health services, including outpatient services and hospital care (Callahan, Hui, Nienaber, Musick, & Tierney, 1994; Koenig & Kuchibhatla, 1998; Koenig, Shelp, Goli, Cohen, & Blazer, 1989; Lubert et al., 2001; Unutzer et al., 1997). The relationship between depressive symptoms and long-term-care outcomes, such as informal care, professional home care, or nursing home care, is less straightforward (Bula, Wietlisbach, Burnand, & Yersin, 2001; Kempen & Suurmeijer, 1991). There may be good reasons to consider the reverse pathway, in which transitions to and ongoing use of long-term care are associated with increases in depressive symptoms. Depression may increase in this transition because initiating the use of care may be in response to decrements in

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underlying health. People who use long-term care will have significant impairments and disabilities and also depressive symptoms, and so the apparent link between depression and long-term care use may be due to the association of both factors to health problems (Fried, Bradley, Williams, & Tinetti, 2001; Lenze et al., 2001). Conversely, it is possible that the initiation of care might have symbolic or practical implications for the individual that lead to an increase in depressive symptoms, independent of changes in health or functioning.

The potential pathway of transitions in care to depressive symptoms has clinical relevance of its own. In clinical practice, decisions about major transitions in the care for older people are made routinely. It is well established that depression may interfere with all aspects of adequate delivery of care (e.g., De Groot, Anderson, Freedland, Clouse, & Lustman, 2001; Dwight-Johnson, Unutzer, Sherbourne, Tang, & Wells, 2001; Gupta, Pansari, & Shetta, 2002; Hasin & Link, 1988; Wells, Schoenbaum, Unutzer, Lagomasino, & Rubenstein, 1999). Therefore, knowledge about the risk of depressive symptoms incurred by transitions in long-term care is of great importance. Unfortunately, there is a lack of research involving the benefits or costs of using different types of long-term care for elders' depressive symptoms and other aspects of their psychological well-being (Lyons & Zarit, 1999).

Our aim in this study was to estimate the longitudinal relationship between transitions in the use of long-term care and older adults' depressive symptoms and to investigate whether this relationship could be explained by markers of older adults' underlying health, or other variables including demographics, indicators of personality, and partner status. This study may be useful in illuminating the reasons why older adults may experience depressive symptoms associated with receiving or transitioning into or out of long-term care.

## Methods

### Sampling and Procedures

This study is part of the Longitudinal Aging Study Amsterdam (LASA), an ongoing longitudinal study on predictors and consequences of changes in well-being and autonomy in the older population (Deeg, Knipscheer, & van Tilburg, 1993). The sampling and procedures adopted to achieve the baseline sample were described in detail in previous publications (Beekman et al., 1995; Beekman, Deeg, van Limbeek, Braam, & De Vries, 1997; Penninx, Geerlings, et al., 1999). Informed consent was obtained prior to the study, in accordance with legal requirements in The Netherlands.

At baseline, the random, nationally representative, age- and gender-stratified sample consisted of 3,107 older adults (55–85 years of age). These respondents

were derived from 11 population registries in three regions of The Netherlands. Baseline data were gathered in face-to-face interviews in the homes of the respondents by specially trained and intensively supervised interviewers in 1992 and 1993. After 3 and 6 years, respectively, a follow-up measurement took place with exactly the same instruments and procedures.

Data on 3,054 participants were available with responses on the use of care and depressive symptoms for at least one of the times of measurement (Sample 1). Characteristics of this first sample ( $n = 3,054$ ) reflect the stratified sample design, oversampling men (48.3%) and older-old adults (age,  $M = 70$  years). Most of the respondents had a low (43.9%) or middle level (42.2%) of education. Because older-old adults were oversampled, the sample included a relatively large proportion of respondents without a partner (36.1%). More than half of the sample (52.8%) received some kind of care at baseline (Table 1). The reason we excluded participants from this first analysis ( $n = 53$ , 1.7%) was that some data were missing on the study variables. These excluded participants were frailer than the rest of the sample. They were older ( $M = 76.59$  vs.  $70.67$ ,  $t = 5.52$ ,  $p = .000$ ) and more often had a low education (68% vs. 44%,  $\chi^2 = 14.67$ ,  $p = .001$ ). They lived more often without a partner (61.5% vs. 36.2%,  $\chi^2 = 14.12$ ,  $p = .000$ ), and they were more often institutionalized (46.9% vs. 3.4%,  $\chi^2 = 163.46$ ,  $p = .000$ ). They had more functional limitations (1.81 vs. 0.73,  $t = 5.93$ ,  $p = .000$ ) and cognitive impairments (20.70 vs. 26.90,  $t = -6.08$ ,  $p = .000$ ), and a lower level of self-perceived efficacy (39.40 vs. 41.84,  $t = -2.26$ ,  $p = .024$ ) at baseline. They did not differ from the included sample on gender, depressive symptoms, number of chronic diseases, or mastery.

To study the relationship between transitions in care and changes in depression, we used data from 2,172 participants who had at least two consecutive measurements of use of care and depression (Sample 2). Most of these individuals had responses on the use of care and depression at all three measurements ( $n = 1,699$ ); some of them at  $t_1$  and  $t_2$  only ( $n = 455$ ); and a few at  $t_2$  and  $t_3$  only ( $n = 28$ ). Reasons for dropping out of the study were death ( $n = 417$ , 13.4%), severe illness or cognitive impairment ( $n = 38$ , 1.2%), refusal ( $n = 90$ , 2.9%), or no longer traceable ( $n = 17$ , 0.5%). Additionally, some individuals completed a shortened or proxy interview ( $n = 323$ , 10.4%) that did not include the outcome or independent variables, and a small number of other people had missing data on those variables on consecutive measurements ( $n = 50$ , 1.6%). The total group of participants excluded in the second sample (30.1% of the total baseline sample size) differed on all variables measured in this study at baseline. They were older and more often male (51.9% vs. 47.0%,  $\chi^2 = 6.19$ ,  $p = .013$ ), and more likely to have a low education (54.8% vs. 40.0%,  $\chi^2 = 59.44$ ,  $p = .000$ ). Dropouts lived more often without

Table 1. Sample Characteristics at Baseline

Variables	Sample 1 ( <i>n</i> = 3,054)			Sample 2 ( <i>n</i> = 2,172)		
	%	<i>M</i> ( <i>SD</i> )	Range	%	<i>M</i> ( <i>SD</i> )	Range
Use of care						
No care	47.2			51.1		
Informal care only	25.3			25.6		
Professional home care	23.1			20.9		
Institutional care	3.4			1.3		
Transitions in care						
From no or informal to professional home care				10.1		
From no, informal, or professional home care to institutional care				0.9		
From professional home or institutional care to no or informal care				3.0		
Remaining in professional home or institutional care				19.5		
Remaining in no or informal care				66.5		
Depressive symptoms		7.97 (7.97)	0–54		7.44 (7.47)	0–54
Gender						
Male	48.3			47.0		
Female	51.7			53.0		
Age		70.67 (8.75)	55–85		69.17 (8.52)	55–85
Education						
Low	43.9			40.0		
Middle	42.2			44.7		
High	13.7			15.3		
Partner status						
With partner	63.7			65.7		
Without partner	36.1			34.0		
No. of chronic diseases		0.99 (1.04)	0–6		0.89 (.97)	0–6
Functional limitations		0.73 (1.02)	0–3		0.60 (.93)	0–3
Cognitive decline		26.90 (3.01)	4–30		27.44 (2.25)	12–30
Mastery		17.23 (3.33)	5–25		17.45 (3.26)	5–25
Self-efficacy		41.84 (5.38)	14–60		42.11 (5.28)	23–59

Note: Prevalence rates showed in this table concern transitions in care between the first and second measurement cycle only.

a partner (42.6% vs. 34.1%,  $\chi^2 = 20.05, p = .000$ ), and they more often used professional care (38.3% vs. 22.5%,  $\chi^2 = 166.08, p = .000$ ). In addition, they had more depressive symptoms ( $M = 9.25$  vs.  $M = 7.44, t = 5.575, p = .000$ ), chronic diseases ( $M = 1.21$  vs.  $M = 0.89, t = 7.17, p = .000$ ), functional limitations ( $M = 1.09$  vs.  $M = 0.60, t = 11.37, p = .000$ ), and cognitive impairment ( $M = 25.31$  vs.  $M = 27.44, t = -13.92, p = .000$ ). They also showed lower levels of mastery ( $M = 16.66$  vs.  $M = 17.45, t = -5.73, p = .000$ ) and self-efficacy ( $M = 41.02$  vs.  $M = 42.11, t = -4.88, p = .000$ ). These characteristics mirror the main reasons for dropping out of the study: death and frailty. Therefore, this second sample ( $n = 2,172$ ) is somewhat less frail in comparison with the first sample, as shown in Table 1.

### Measures

**Dependent Variable.**—We measured depressive symptoms by using the Center for Epidemiologic Studies Depression (CES-D) scale (Radloff, 1977). This is a 20-item self-report scale developed to

measure depressive symptoms in the community. Items are scored on a 4-point scale, ranging from 0 (rarely or none of the time) to 3 (most or all of the time). Total scores range from 0 to 60. The CES-D has good reliability and validity (Beekman et al., 1997; Radloff & Teri, 1986). Researchers have used this scale widely in older community samples. The overlap with physical symptoms has been shown to be limited (Berkman et al., 1986; Foelker & Shewchuk, 1992).

**Independent Variable.**—To measure the use of and transitions in long-term care, the central independent variables in this study, we had interviewers ask respondents if they received help for basic activities of daily living and, if so, from what sources. The interviewers explained that, with personal care, one of the following activities was meant: to wash, to bathe or shower, to put clothes on or off, to go to the toilet, to get up and sit down. The same two questions were asked for help received for instrumental activities of daily living. The interviewers explained that one of the following domestic task activities was meant: preparing meals, shopping, cleaning the

house, taking the garbage bags outside, and filling out forms. In this study, sources of care that we determined were as follows: informal care, provided by partners, relatives, friends, or neighbors; professional home care, consisting of household or nursing care provided by subsidized or out-of-pocket paid professionals; and institutional care, which took place in a residential or nursing home or psychiatric hospital. For the purpose of this study, we examined the sources of care for a combination of personal and household care. Because there was a relatively small group of older adults receiving professional *and* informal care ( $n = 162$ ), we combined them with those receiving professional home care only. Thus, for example, if a respondent received household help from the partner and no personal help at all, we scored this as informal care. If a respondent received household help from the partner and professional personal care, we scored this as professional home care.

We defined four dummy variables for the following transitions in care: (a) from no or informal care to professional home care; (b) from no or informal care to institutional care; (c) continuing professional home or institutional care; and (d) from institutional or professional home care to no or informal care. For all dummy variables, the reference category was receiving no or informal care at both measurements. We did not look at transitions from no to informal care, because that arrangement seemed rather transient over time, and the focus of our study was professional long-term care.

**Covariates.**—We based our selection of covariates on the stress-vulnerability model of depression (Brown & Harris, 1978; Goldberg & Huxley, 1992). We considered several vulnerability variables for depression: demographics (gender, age, and education), indicators of health, personality, and social network. We defined two dummy variables for education: middle versus low and high versus low. Low education refers to elementary education or less; high education refers to high school, college, or university; and middle education refers to types of education between low and high education. We measured the number of chronic physical diseases by using self-reports of the respondents, and these concerned the presence of seven major diseases: chronic lung diseases (asthma, bronchitis, and pulmonary emphysema), cardiac diseases, peripheral atherosclerotic disease, stroke (excluding transient ischemic attacks), diabetes mellitus, malignant neoplasms, and osteoarthritis and rheumatoid arthritis. In a previous study, we cross-checked patients' self-reports on the selected chronic diseases by using records from general practitioners. Misclassifications were not associated with depressive symptoms (Kriegsman, Penninx, van Eijk, Boeke, & Deeg, 1996). We summed the number of chronic diseases for the analyses. We measured functional limitations

by using a scale previously validated in The Netherlands (Kriegsman, Deeg, van Eijk, Penninx, & Boeke, 1997; Van Sonsbeek, 1988). The scale consists of three items: the ability to use one's own or public transportation, to climb stairs, and to cut one's own toenails. We used the Mini-Mental State Examination (MMSE) as a measure of cognitive impairment (Folstein, Folstein, & McHugh, 1975). For indicators of personality, we measured mastery by using an abbreviated 5-item version of a scale developed by Pearlin and Schooler (1978). The instrument for measuring self-efficacy was the translated 12-item General Self-Efficacy Scale (Bosscher & Smit, 1998; Sherer et al., 1982). We recorded the presence or absence of a partner as an indicator of social network.

### Data Analysis

We studied the longitudinal relationship between care utilization and depressive symptoms by using generalized estimating equations (GEEs; Liang & Zeger, 1986; Twisk, 1997, 2003). GEE analysis can be seen as a linear regression analysis, which takes into account that the same subjects are measured over time. One of the advantages of GEE analysis is that it does not require a balanced design (i.e., observations at all occasions on each person) as in commonly used methods for analyzing repeated measurements.

To analyze the relationship between use of care and depressive symptoms, we carried out two analyses. In a first analysis, we estimated regression coefficients for the relationship between the predictor variable "use of care" and outcome variable "depressive symptoms" at time  $t_x$  ( $x = 1, 2, \text{ or } 3$ ). In this analysis, we model "use of care" at the same time as depressive symptoms. We performed this analysis by using a logarithmic transformation of the CES-D scale, because the scores were highly skewed to the right.

In a second analysis, we related transitions in care between subsequent time points  $t_{x-1}$  to  $t_x$  to changes in depressive symptoms between the same time points. To correct for the phenomenon of regression to the mean in the latter, we made a correction for depressive symptoms at  $t_{x-1}$ . Because of this correction, we did not find it necessary to use a logarithmic transformation of the CES-D scale. The second analysis is also known as autoregressive analysis (Twisk, 1997, 2003).

We performed each analysis in three steps. In the first step, we made no adjustments in the relation of the independent variable to the dependent measure. In the second step, we adjusted the model for gender, age, and education; in the third step, we also entered the other characteristics of the respondents into the analyses at  $t_{x-1}$ : number of chronic diseases, physical limitations, cognitive impairment, mastery, self-efficacy, and partner status. In addition, we included the concomitant changes in functional limitations between  $t_{x-1}$  and  $t_x$ . This approach allows us to

Table 2. Relationship Between Use of Care and Depressive Symptoms, Before and After Successive Adjustment for Covariates

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, Health, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	1.678	.020	.000	0.596	.143	.000	4.371	.211	.000
Time	0.018	.004	.000	0.022	.004	.000	-0.003	.004	.381
No vs. informal care	0.071	.028	.010	0.064	.027	.019	-0.007	.004	.783
No vs. professional home care	0.326	.028	.000	0.267	.030	.000	0.107	.026	.000
No vs. institutional care	0.583	.057	.000	0.439	.058	.000	0.083	.028	.203
Gender				0.278	.029	.000	0.124	.026	.000
Age				0.011	.002	.000	-0.008	.002	.000
Education (middle vs. low)				-0.156	.031	.000	-0.031	.027	.265
Education (high vs. low)				-0.204	.044	.000	-0.021	.038	.580
No. of chronic diseases							-0.004	.004	.295
Physical limitations							0.146	.012	.000
Cognitive decline							0.081	.011	.000
Mastery							-0.075	.004	.000
Self-efficacy							-0.020	.002	.000
Partner status							-0.246	.028	.000

Notes: Logarithms of scores of depressive symptoms were used, because of skewed data. The regression coefficient is *B*.

examine if the observed relationship of service use and depression could be explained by demographic, health, or psychological factors. In all three steps, we adjusted the model for time of measurement of the outcome variable. We then reanalyzed the data for respondents with and without disability at  $t_{x-1}$  in order to better isolate any actual effect associated with the receipt of care.

## Results

Almost half of the baseline sample received some kind of long-term care. The most common care was informal care (25%), followed by professional home care (23%) and institutional care (3%). In 3 years' time, 11% of the sample showed a transition to a higher level of care, either professional home care or institutional care. A small percentage (3%) showed a backward transition, from professional home care or institutional care to no or informal care at home.

### *The Relationship Between the Use of Care and Depressive Symptoms*

We found a highly significant association between the use of care and depressive symptoms. Tables 2, 3, and 4 show that older adults receiving either informal care, professional home care, or institutional care had significantly more depressive complaints as compared with those receiving no care. We performed the analyses after logarithmic transformation of the CES-D scale scores. Therefore, we calculated antilogarithms of the regression coefficients to determine the difference in depression scores for each source of care as compared with the reference category "no use of care." Overall, older adults

receiving informal care scored 7% higher on the CES-D scale ( $e^B = e^{0.071} = 1.07$ ), those receiving professional home care scored 39% higher ( $e^B = e^{0.326} = 1.39$ ), and those who were institutionalized scored 79% higher ( $e^B = e^{0.583} = 1.79$ ). Adjusting for gender, age, and education reduced the regression coefficients for this association only to a small extent. Older adults receiving informal care, professional home care, or institutional care still scored 7% to 55% higher on the CES-D scale at time  $t_x$ . Adjusting for indicators of health and other covariates (i.e., Step 3), we found that older adults receiving informal or institutional care no longer had significantly higher depression scores as compared with those receiving no care. Those receiving professional home care still scored 11% higher on the CES-D scale at time  $t_x$ .

When we reanalyzed the data for respondents with and without functional limitations in order to better isolate any actual effect associated with the receipt of care, we found that the use of professional home care or institutional care was significantly associated with depression scores for both groups, even after we adjusted for indicators of health status and other covariates. Older adults without functional limitations scored 8% (professional home care) and 73% (institutional care) higher, and older adults with functional limitations scored 20% (professional home care) and 23% (institutional care) higher on the CES-D scale at time  $t_x$ .

### *The Relationship Between Transitions in Care and Changes in Depressive Symptoms*

We also found a highly significant association between transitions in care and changes in depressive symptoms (Tables 5, 6, and 7). Compared with those

**Table 3. Older Adults Without Functional Limitations**

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	1.537	.025	.000	0.933	.192	.000	4.553	.321	.000
Time	0.007	.005	.212	0.008	.005	.143	-0.000	.005	.929
No vs. informal care	-0.022	.037	.554	0.005	.037	.893	-0.003	.035	.941
No vs. professional home care	0.138	.045	.002	0.145	.047	.002	0.081	.042	.054
No vs. institutional care	0.404	.245	.099	0.388	.239	.105	0.551	.282	.051
Gender				0.283	.038	.000	0.152	.036	.000
Age				0.004	.002	.109	-0.007	.002	.005
Education (middle vs. low)				-0.121	.041	.003	-0.056	.038	.137
Education (high vs. low)				-0.160	.056	.004	-0.046	.052	.378
No. of chronic diseases							0.080	.020	.000
Cognitive decline							-0.009	.007	.207
Mastery							-0.082	.006	.000
Self-efficacy							-0.020	.003	.000
Partner status							-0.296	.040	.000

*Notes:* The relationship is shown between use of care and depressive symptoms, before and after successive adjustment for covariates. Logarithms of scores of depressive symptoms were used, because of skewed data. The regression coefficient is *B*.

still receiving no or informal care only, older adults with a transition from no or informal care to professional home care scored 1.9 points higher on the CES-D scale (*B* = 1.9). Compared with the mean baseline CES-D score of the reference group (*M* = 6.6), this is an increase of 29%. Older adults who remained in professional home or institutional care scored 2.2 points higher (*B* = 2.2), whereas those who were institutionalized scored 4.8 points higher (*B* = 4.8). Compared with the mean baseline CES-D score of the reference group, this is an increase of 33% and 73%, respectively. Respondents with a backward transition, from professional care at

home or in an institution to no or informal care at home, showed no significant change in depression scores. Adjusting for gender, age, and education reduced the significant associations found to some extent. Adjusting for indicators of health status and the covariates showed that older adults with a transition from no or informal care to professional home care scored 0.9 points higher on the CES-D scale (*B* = 0.9). Those who had no transition in care but still received professional home or institutional care scored 1.3 points higher on the CES-D scale (*B* = 1.3) as compared with those staying at home and receiving no or informal care only. Those with

**Table 4. Older Adults With Functional Limitations**

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	1.933	.032	.000	1.599	.195	.000	4.582	.277	.000
Time	0.014	.005	.008	0.015	.005	.003	-0.000	.005	.925
No vs. informal care	0.078	.042	.062	0.072	.042	.087	0.016	.039	.685
No vs. professional home care	0.299	.037	.000	0.284	.039	.000	0.180	.037	.000
No vs. institutional care	0.442	.005	.008	0.402	.064	.000	0.206	.070	.003
Gender				0.156	.037	.000	0.100	.035	.004
Age				0.002	.002	.402	-0.008	.002	.001
Education (middle vs. low)				-0.111	.039	.005	-0.001	.036	.983
Education (high vs. low)				-0.141	.058	.014	0.004	.051	.937
No. of chronic diseases							0.098	.013	.000
Cognitive decline							-0.004	.005	.403
Mastery							-0.078	.005	.000
Self-efficacy							-0.019	.003	.000
Partner status							-0.216	.034	.000

*Notes:* The relationship is shown between use of care and depressive symptoms, before and after successive adjustment for covariates. Logarithms of scores of depressive symptoms were used, because of skewed data. The regression coefficient is *B*.

**Table 5. The Longitudinal Relationship of Transitions in Care on Changes in Depressive Symptoms (Using an Autoregressive Model), Before and After Successive Adjustment for Covariates**

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	2.587	0.350	.000	-2.369	1.022	.020	11.705	2.127	.000
Depressive symptoms $t_{x-1}$	0.560	0.021	.000	0.535	0.022	.000	0.422	0.024	.000
Time	0.157	0.070	.025	0.194	0.070	.005	0.122	0.080	.080
To professional home care	1.865	0.375	.000	1.515	0.382	.000	0.862	0.372	.020
To institutional care	4.790	1.024	.000	3.680	1.036	.000	2.284	1.181	.053
Continuing professional home or institutional care	2.246	0.265	.000	1.781	0.295	.000	1.337	0.297	.000
To no or informal care only (transition backward)	0.634	0.608	.297	0.536	0.606	.377	0.529	0.590	.370
Gender				1.009	0.199	.000	0.775	0.207	.000
Age				0.059	0.013	.000	-0.018	0.014	.207
Education (Middle vs. low)				-0.658	0.217	.002	-0.349	0.223	.117
Education (High vs. low)				-0.963	0.293	.001	-0.429	0.294	.145
No. of chronic diseases							0.279	0.124	.025
Functional limitations							-0.248	0.169	.143
Cognitive decline							-0.014	0.050	.773
Mastery							-0.302	0.041	.000
Self-efficacy							-0.073	0.023	.001
Partner status							0.034	0.255	.893
Change in functional limitations							1.392	0.153	.000

*Notes:* Changes in depressive symptoms are modeled by adjustment for depressive symptoms at  $t_{x-1}$ . The regression coefficient is *B*. Reference group is “no or informal care only” at both measurements  $t_x$  and  $t_{x-1}$ .

a transition from no or informal care to institutional care scored 2.3 points higher on the CES-D scale ( $B = 2.3$ ) as compared with those staying in the community. Compared with the mean CES-D score of the reference group, these are increases of 14%, 20%, and 35%, respectively. Again, older adults with a backward transition showed no significant changes in depression scores as compared with those staying at home with no or informal care only.

When we reanalyzed the data for older adults with and without functional limitations we found the same results, after we adjusted for indicators of health status and other covariates. We found a somewhat higher coefficient for older adults without functional limitations and a transition to institutional care ( $B = 2.8$  compared with 2.3 for the whole sample), but this value was not significant ( $p = .267$ ) because there was a limited number of institutional placements that limited statistical power. Only older adults without functional limitations who continued professional home care or institutional care showed significant changes in depressive symptoms ( $B = 0.8$ ,  $p = .042$ ). Older adults without functional limitations with a transition to professional home care did not show a significant change in depressive symptoms after we adjusted for the covariates. For older adults who did report functional limitations, we found the following *B* coefficients: for those with a transition to institutional care,  $B = 1.3$  ( $p = .090$ ); for those with a transition to professional home care,

$B = 1.4$  ( $p = .018$ ); and for those continuing professional home or institutional care,  $B = 1.9$  ( $p = .000$ ).

## Discussion

Our aim in this study was to estimate the longitudinal relationships of the use of long-term care and transitions in long-term care to depressive symptoms among the older population (55–85 years) in The Netherlands.

Results of this population-based study showed an association between professional care utilization and depressive symptoms over time, and between transitions in professional care and changes in depressive symptoms. Older adults with a transition to professional care reported considerably more depressive symptoms compared with those who did not receive professional care. Older adults who had a backward transition, from professional care to no or informal care only, did not show such change in depressive symptoms.

An interpretation of why depressive symptoms might increase with service use is rather complex. A relatively straightforward explanation of the findings is that older adults who are more impaired will use professional long-term care or will initiate this type of care, and these same people will show an increase in depressive symptoms. From this perspective, the

Table 6. Older Adults Without Functional Limitations

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	2.792	0.399	.000	-2.759	1.325	.037	6.794	2.549	.008
Depressive symptoms $t_{x-1}$	0.499	0.030	.000	0.482	0.031	.000	0.392	0.032	.000
Time	0.087	0.082	.292	0.131	0.081	.108	0.104	0.081	.201
To professional home care	0.974	0.460	.034	0.764	0.454	.093	0.435	0.450	.334
To institutional care	5.500	2.368	.020	4.255	2.457	.083	2.781	2.507	.267
Continuing professional home or institutional care	1.132	0.364	.002	0.862	0.382	.024	0.780	0.384	.042
To no or informal care only (transition backward)	0.941	0.763	.271	0.807	0.749	.281	0.679	0.744	.362
Gender				1.164	0.244	.000	0.865	0.253	.001
Age				0.062	0.017	.000	0.014	0.018	.428
Education (Middle vs. low)				-0.354	0.263	.178	-0.313	0.267	.242
Education (High vs. low)				-0.657	0.339	.053	-0.475	0.341	.163
No. of chronic diseases							0.086	0.159	.586
Cognitive decline							0.100	0.062	.106
Mastery							-0.261	0.049	.000
Self-efficacy							-0.089	0.028	.001
Partner status							-0.164	0.327	.617
Change in functional limitations							1.420	0.201	.000

*Notes:* Table shows the longitudinal relationship of transitions in care on changes in depressive symptoms (using an autoregressive model), before and after successive adjustment for covariates. Changes in depressive symptoms are modeled by adjustment for depressive symptoms at  $t_{x-1}$ . The regression coefficient is *B*. Reference group is “no or informal care only” at both measurements  $t_x$  and  $t_{x-1}$ .

association of use of care or transition into care with depressive symptoms would be due to poor health. To examine this possibility, we adjusted for several indicators of underlying health in the analyses, including concomitant change in functional limitations, as well as for demographic and personality factors. Results showed that functional limitations and cognitive decline, together with demographics, personality characteristics, and partner status, reduced the associations found between (transitions in) the use of care and (changes in) depressive symptoms. However, most of the associations remained significant after adjustment, and also after we reanalyzed the data for respondents with and without functional limitations. It may be, however, that there are still other markers of health or functional impairment that we did not measure that would further account for this association between professional service use and depressive symptoms.

It is also important to consider the possibility that service use or the transition into service use has an impact on depressive symptoms, even after the effects of health status are controlled for. Although it is perhaps counterintuitive that service use would lead to increased depression, there are several possible ways in which the context and symbolic meaning of service use could have this effect. The use of professional long-term care may act as an additional stressor or a stressful life event because of its relationship with disappointments or losses (Brown

& Harris, 1986; Devanand, Kim, Paykina, & Sackeim, 2002; Lin, Dean, & Ensel, 1986). Older adults may be dissatisfied by deficiencies in the care they receive, such as unreliable and shifting home helpers or nursing staff, or agencies that are inflexible in meeting their clients' needs (Rudin, 1994; Zarit, Gaugler, & Jarrott, 1999). In The Netherlands, there was a serious shortage of professional home care as well as institutional care during the data-collection period, putting the quantity and quality of care under pressure (Prismant, 2000). It is also possible that older adults may develop a sense of loss when they use professional care, because they view their dependency on others as enduring and increasing over time.

The use of help may also be stressful if there is an imbalance between older adults' resources and the care they receive, or what Lawton (1986) characterized as a lack of person-environment fit. A recent study showed that older women with osteoarthritis receiving a high level of spousal support and for whom being functionally independent was highly important reacted more negatively to this support. These negative reactions were related to a higher level of depressive symptoms (Martire, Stephens, Druley, & Wojno, 2002). In a study among nursing home residents, the psychological adjustment of residents with self-determined motivational styles was better when they lived in homes providing opportunities for freedom and choice and vice versa (O'Connor & Vallerand, 1994). Long-term care services that do not



Table 7. Older Adults With Functional Limitations

Variables	Before Adjustment			After Adjustment for Gender, Age, and Education			After Adjustment for Gender, Age, Education, and Other Covariates		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Constant	3.673	0.652	.000	4.196	2.023	.038	17.239	3.659	.000
Depressive symptoms $t_{x-1}$	0.555	0.029	.000	0.541	0.029	.000	0.435	0.031	.000
Time	0.147	0.122	.230	0.149	0.125	.234	0.142	0.123	.248
To professional home care	2.002	0.593	.001	2.049	0.620	.001	1.428	0.606	.018
To institutional care	3.532	1.165	.002	3.530	1.165	.002	1.260	1.334	.090
Continuing professional home or institutional care	2.244	0.393	.000	2.359	0.445	.000	1.884	0.453	.000
To no or informal care only (transition backward)	0.249	1.031	.809	0.274	1.036	.792	0.096	0.958	.920
Gender				0.567	0.348	.103	0.723	0.374	.053
Age				-0.014	0.024	.578	-0.063	0.026	.016
Education (Middle vs. low)				-0.782	0.368	.034	-0.344	0.394	.383
Education (High vs. low)				-0.699	0.532	.189	-0.112	0.547	.837
No. of chronic diseases							0.392	0.182	.031
Cognitive decline							-0.113	0.076	.137
Mastery							-0.363	0.069	.000
Self-efficacy							-0.057	0.038	.140
Partner status							0.283	0.401	.481
Change in functional limitations							1.170	0.199	.000

Notes: Table shows the longitudinal relationship of transitions in care on changes in depressive symptoms (using an autoregressive model), before and after successive adjustment for covariates. Changes in depressive symptoms are modeled by adjustment for depressive symptoms at  $t_{x-1}$ . The regression coefficient is *B*. Reference group is “no or informal care only” at both measurements  $t_x$  and  $t_{x-1}$ .

take into account these types of person characteristics may contribute to increased dependency and depressive symptoms.

The association between receiving professional care and depressive symptoms could also be the result of a loss of positive reinforcement that is due to less frequent contact between the older person and his or her close relationships and less participation in pleasant activities (Lewinsohn & Arconad, 1981). This reduction in reinforcement may result in dysphoric mood and, as a consequence, in depressive behavior. A controlled study among patients with dementia and depression showed that increased levels of activities were related to decreased levels of depressive symptoms (Teri, Logsdon, Uomoto, & McCurry, 1997).

We can, at this time, only speculate on the mechanisms of the relationship between transitions to or ongoing use of professional care with depressive symptoms. The results of this study are based on naturalistic observations of older adults and are not from a controlled experiment on long-term-care utilization among older adults. As we already noted, we cannot rule out that some unmeasured aspects of health or functional impairment account for the results. However, the findings do suggest that any such trial should consider the hypothesis that receiving professional long-term care could also provide new stressors and increased risk of depressive symptoms. The value of this study is that it may illuminate the concerns of elders

regarding their use of professional long-term care, and it may help in planning for more effective delivery of this type of care.

There are several other limitations of this study. Three years between the measurements is a relatively long period, considering the changes that may take place in care utilization as well as depressive symptoms (Geerlings, Beekman, Deeg, & van Tilburg, 2000). However, despite these fluctuations, we found strong associations between care utilization and depressive symptoms. For future studies on long-term-care utilization and depressive symptoms, we recommend at least four measurements with shorter intervals, enabling the use of a time lag model.

Another methodological issue is the selective attrition in our cohort of frail and deceased elders. Loss to follow-up is an inevitable consequence of following a cohort over a relatively long period of time (6 years). Because we oversampled men and older-old subjects, we expected substantial attrition rates. However, this selective attrition has certainly not resulted in a “healthy” sample, as all study variables still reflected a full range of impairment after 6 years. Because respondents using relatively more professional care (Samples 1 and 2) and having relatively more depressive complaints (Sample 2 only) dropped out of the study, we may have underestimated the strength of the relationship between (transitions in) the use of care and depressive complaints.

We used a global indicator of the use of long-term care. Although we distinguished a broad range of

long-term care—informal care, professional home care, and institutional care—we defined the use of care dichotomously as any contact with these types of care. We did not examine the frequency, intensity, or duration of services. We also did not examine whether the use was initial use or reuse. Alternative methods of defining service use might have led to different results and conclusions (Townsend, 1993). Furthermore, we did not take transitions from no to informal care or vice versa into account, because they seemed transient instead of enduring whereas our focus was on the use of professional long-term-care services.

In this study, professional home care included paid out-of-pocket help for cleaning. This may confound the results, because we could not take into account whether this help was a necessity or a luxury. However, in an earlier study (Geerlings, Pot, Twisk, & Deeg, in press), transition to private help was studied separately and found to be predicted by a higher age, having no partner, a higher educational level, a higher income, and more chronic physical diseases (stable diseases as well as incident comorbid diseases). Therefore, we feel that, in The Netherlands, transitions to private help for cleaning during this study will be more indicative of not being able to run the household in the way people were used to than as a luxury.

From the literature on caregivers of dementia patients, it is well known that caregiving may have a differential impact on aspects of well-being (George & Gwyther, 1986; Pot, Deeg, & van Dyck, 1997). In future studies on the relationship between the use of care and the impact on care receivers, other indicators of well-being may be worth examining as well, such as positive affect or care-related distress of the care receivers. A next step for researchers would be to make a closer examination of the emotional adaptation to receiving care of older adults, taking into account that using long-term care may induce new stressors, may reduce positive reinforcement, or may be out of balance with the resources of the care receiver. This knowledge will provide us with clues for prevention and intervention of depressive symptoms when older adults need long-term care.

Future studies on the relationship between the use of care and older adults' depressive symptoms and other aspects of their psychological well-being will be important for professionals working in long-term care. They need to know the consequences of their decisions about major transitions in the care for older adults in order to avoid unwanted side effects. This knowledge may be used to improve effective delivery of professional care to older adults.

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