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**Caregiver Employment Status and Time to
Institutionalization of Persons with Dementia**

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SEDAP Research Paper No. 217

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Secretary, SEDAP Research Program
Kenneth Taylor Hall, Room 426
McMaster University
Hamilton, Ontario, Canada
L8S 4M4
FAX: 905 521 8232
e-mail: sedap@mcmaster.ca

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Caregiver Employment Status and Time to Institutionalization of Persons with Dementia

Mark Oremus^{1,2}, Parminder Raina^{1,2}

¹McMaster Evidence-based Practice Centre, McMaster University

²Department of Clinical Epidemiology and Biostatistics, McMaster University

Corresponding author

Parminder Raina, PhD
McMaster Evidence-based Practice Centre
Department of Clinical Epidemiology and Biostatistics
McMaster University DTC
50 Main Street East, Room 308
Hamilton, Ontario L8N 1E9
Canada
Phone: (905)525-9140, x22197
Fax: (905)522-7681
E-mail: praina@mcmaster.ca

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Abstract

Background. This study was undertaken to examine the association between caregiver employment status and the time to institutionalization of persons with dementia. No study has previously examined this association.

Methods. The database of the Canadian Study of Health and Aging was used to obtain data on 326 caregiver/care-recipient dyads. Caregivers were primary, informal carers; care-recipients were diagnosed with dementia and living in the community at baseline. Care-recipients were followed from the date of their baseline screening interview until the date of institutionalization, the date of death before institutionalization, or the date of the 5-year follow-up interview. An accelerated failure time model with a Weibull distribution was used to conduct the survival analysis.

Results. During the 5-year follow-up period, 139 care-recipients (45%) were institutionalized; the median time to institutionalization was 1,821 days (95% confidence interval [CI]: 1,539-1,981 days) for the care-recipients of employed caregivers and 1,542 days (95% CI: 1,284-1,653 days) for the care-recipients of unemployed caregivers ($p = 0.0634$). The adjusted acceleration factor was 1.85 (95% CI: 1.08-3.86), controlling for caregiver thoughts about institutionalizing the care-recipient, caregiver health, and the use of a day center to help provide care.

Conclusions. For the care-recipients of employed caregivers, the adjusted time to institutionalization was longer than for the care-recipients of unemployed caregivers.

Résumé

Contexte. Cette étude a été menée afin d'examiner la relation entre la situation professionnelle des donneurs de soins et la période précédant le placement en établissement des personnes atteintes de démence. Aucune étude ne s'est jamais penchée sur cette association.

Méthodes. La base de données de l'Étude canadienne sur la santé et le vieillissement a été utilisée afin d'obtenir des données sur 326 dyades de donneurs / receveurs de soins. Les donneurs de soins étaient les donneurs principaux et informels; les receveurs avaient reçu un diagnostic de démence et demeuraient au départ dans leur communauté. Les receveurs de soins étaient suivis depuis la date de leur entrevue d'admission jusqu'à la date de leur placement, la date de leur décès si ce dernier survenait à une date antérieure au placement, ou à la date de l'entretien de suivi cinq années plus tard. L'analyse de survie des données fut conduite à l'aide d'un modèle du temps de défaillance accéléré avec une distribution de Weibull.

Résultats. Durant la période de suivi de cinq ans, 139 receveurs de soins (45%) ont été placés; la période médiane précédant leur placement était de 1,821 jours (intervalle de confiance [IC] : 1,539-1,981 jours) pour les receveurs de soins de donneurs de soins avec un emploi et de 1,542 jours (IC de 95% : 1,284-1,653 jours) pour les receveurs de soins de donneurs de soins sans emploi ($p = 0.0634$). Le facteur d'ajustement d'accélération était de 1,85 (95% IC : 1.08-3.86), tenant compte des intentions du donneur de soins de faire placer le receveur de soins, de la santé du donneur de soins, et du recours à une clinique de jour pour aider à dispenser les soins.

Conclusions. Pour les receveurs de soins de donneurs de soins avec un emploi, la période ajustée antérieure au placement était plus longue que pour les receveurs de soins de donneurs de soins sans emploi.

Introduction

The number of persons with dementia is expected to rise more than 2-fold over the next twenty-five years (1). Research suggests 75% of these persons will be institutionalized within seven years of being diagnosed (2). Patient-level factors associated with institutionalization include disability in activities of daily living (ADLs), cognitive impairment, living status (living alone or with a caregiver), and behavior problems (3-5). Caregiver factors include age, ill-health, distress, burden, satisfaction, need for skilled help with caring, social support, use of community services, and relationship to patient (3-9).

One caregiver factor that has received scant attention in the literature is the carer's employment status. One-third of employed, informal caregivers report that caregiving responsibilities cause job disturbances (e.g., workplace distractions or unintended absences) (10). These disturbances might interfere with job performance or threaten job security, leading caregivers to institutionalize their loved one (11). Conversely, if employed caregivers view their job as a respite from the demands of caregiving (11,12), then caregiver employment could be inversely associated with institutionalization.

Only two published studies provide insight into the association between caregiver employment and institutionalization in dementia. Gilhooly studied 48 caregivers of persons with "senile dementia" and found employment to be positively correlated with caregivers' expressed "preference for institutional care" ($r = 0.305$; $p < 0.05$) (11). Pett et al. examined 181 female dementia caregivers and found no association ($p > 0.05$) between employment status (i.e., full-time homemaker, full-time employed, part-time employed) and caregiver desire to institutionalize (12). Limitations to both studies included highly select samples, no linkages between expressed preferences or desires to institutionalize and actual institutionalization, a lack

of control for confounding, and in Gilhooly's case (11) the use of a correlation coefficient to infer association.

The present study was designed to provide a more thorough examination of the association between caregiver employment status and the time to institutionalization of persons with dementia. Since the decision to institutionalize may be caregiver-driven (13), policies aimed at delaying institutionalization will only be effective if they are developed with an understanding of all caregiver factors that are associated with institutionalization.

Methods

Data for this study were drawn from the Canadian Study of Health and Aging (CSHA), a population-based study of dementia in Canada. The CSHA consisted of 10,263 community-dwelling or institutionalized persons aged 65 years or over who were randomly sampled from 36 communities across Canada. CSHA data were collected in 1991 (CSHA-1), 1996 (CSHA-2), and 2001 (CSHA-3). Details of the CSHA are reported elsewhere (14).

The caregivers of a subgroup of the CSHA sample were interviewed to obtain information on caregiver support networks, care-recipients' ability to perform ADLs, care-recipients' behavior disturbances, and caregiver burden and depression. Caregivers were also asked if they currently worked for pay, as well as their weekly average number of hours worked, the effects of providing care on their employment, and the reasons for stopping work if they were no longer employed.

The present study included 326 caregiver/care-recipient dyads (Figure 1). Each caregiver was the primary, informal (unpaid) carer of a person with dementia (the care-recipient). Care-recipients had to reside in the community and have a diagnosis of dementia at CSHA-1.

The association between caregiver employment status and the time to institutionalization of care-recipients was investigated using multivariable survival analysis. Care-recipients were followed from the date of their baseline screening interview at CSHA-1 to whichever occurred first: date of admission to institution; date of death (censored); or date of CSHA-2 follow-up interview (censored). The date of admission to an institution was obtained through direct questioning of surviving care-recipients and their caregivers at CSHA-2. For care-recipients who died prior to CSHA-2, the date was obtained in an interview with the decedent's caregiver. Institutions were defined as residences where staff formally supervised care-recipients. These residences included nursing homes, chronic care and psychiatric institutions, and hospital stays of more than three months. Short-term stays in a hospital or other health facility for convalescence or rehabilitation were not regarded as institutionalization. The data were fit to several different survival models (e.g., Cox proportional hazards, Weibull and exponential accelerated failure time [AFT] models). A visual inspection of residual plots (i.e., Cox-Snell, deviance, Martingale) indicated that an AFT model with a Weibull distribution was the best-fitting model.

AFT models assume independent variables act multiplicatively on the speed of progression to an outcome. The measure of effect is an 'acceleration factor' (AF). For example, in a study of time to institutionalization, an AF of 1.5 means people in group A have an average time to institutionalization that is 50% longer than people in group B. An AF of 0.5 means group A has an average time to institutionalization that is half as long as group B. A Weibull AFT model assumes survival times have a Weibull distribution (15).

The dependent variable in the AFT model was the time (in days) to institutionalization for care-recipients. The main effect (independent) variable—caregiver employment status—was a ‘yes/no’ response to the question “Do you currently [at CSHA-1] work for pay?”

Several covariates (Table 1) were evaluated for possible interactions with caregiver employment status. The choice of which covariates to evaluate was based on the published literature (3-9,16-18).

The form of some CSHA variables was altered before they were included as covariates in this study. In the CSHA, caregiver burden and depression, and care-recipient difficulty with ADLs, were assessed using outcome measurement instruments. Burden was assessed using the Zarit Burden Interview (5), which has a score range of 0 to 88. Higher scores indicate greater burden. In this study, the covariate was dichotomized to measure effects on caregivers with very severe or extreme burden (scores > 27).(19) Depression in the CSHA was assessed using the Centre for Epidemiologic Studies Depression Scale (20), which has a score range of 0 to 60. This covariate was also dichotomized, with scores less than or equal to 11 representing borderline depression or not depressed. The continuous scores for burden and depression were dichotomized at what were considered to be clinically relevant cut points. The alternative was to maintain the variables as continuous and assume that each one-unit change in scale score would have an equal effect on care-recipient time to institutionalization. There was no evidence to suggest that an equal effect was the case.

Care-recipient difficulty with ADLs was assessed in the CSHA using the Activities of Daily Living scale from the Older Americans Resources and Services Project (1,13). This scale measures the degree of difficulty in performing 14 different ADLs (e.g., eating, dressing, walking). In this study, the covariate was categorized as follows: care-recipient has any level of

difficulty with less than 3, 3 or 4, or more than 4 ADLs. Care-recipient difficulty with behaviors was categorized for this study as follows: difficulty with none, 1 or 2, or more than 2 out of five possible behaviors. These behaviors were apathy, wandering, physical violence, disinhibition, or one of several miscellaneous behaviors (e.g., agitation).

Each covariate was evaluated by placing it in a simple AFT model as the only independent variable (time to institutionalization remained the dependent variable). The covariate was included in the multivariable AFT model for caregiver employment status and care-recipients' time to institutionalization if the p -value of its regression coefficient was ≤ 0.25 . Once all of the covariates satisfying the $p \leq 0.25$ criterion were added to the multivariable model, each covariate was individually removed to examine whether the regression coefficient for caregiver employment status would change (confounding). Removal was done sequentially from largest to smallest p -value. If removal changed the regression coefficient for employment status by at least 10%,(21) then the covariate was retained in all future iterations of the multivariable model. Otherwise, the covariate was permanently removed from the model.

To supplement the study of the association between caregiver employment status and care-recipients' time to institutionalization, the multivariable model was stratified by employment status to see if the covariates had a differential effect on outcome depending on whether caregivers worked or not.

The threshold of statistical significance for all analyses was the 5% level ($p < 0.05$). All analyses were performed using SAS v9.1 (The SAS Institute, Cary, NC).

Results

Seventy percent of caregivers did not work for pay at baseline. Work stoppage data were available for 149 caregivers, and only seven (5%) reported stopping work to care for a loved one. The principal reasons for stopping work were retirement ($n = 47$ [32%]) or family commitments ($n = 31$ [21%]). Among working caregivers, the median number of weekly hours worked was 38 (25% to 75% interquartile range: 35 to 40). Employment was not associated with whether care-recipients used more than one caregiver ($p = 1.00$). Table 1 contains a complete summary of sample characteristics.

Outcome data on institutionalization and death were available for 306 care-recipients (20 had missing data). One hundred thirty-nine care-recipients were institutionalized between CSHA-1 and CSHA-2 (45%), 124 died before institutionalization (41%), and 43 continued to reside in the community at CSHA-2 follow-up (14%). The median time to institutionalization was 1,821 days (95% confidence interval [CI]: 1,539 to 1,981 days) for care-recipients whose caregiver worked for pay and 1,542 days (95% CI: 1,284 to 1,653 days) for care-recipients whose caregiver did not work for pay ($p = 0.0634$). Figure 2 shows the Kaplan-Meier survival curve.

After examining the simple AFT models for all of the covariates in Table 1, eight covariates were included in the multivariable AFT model with caregiver employment status and time to institutionalization. One covariate that failed to meet the $p \leq 0.25$ inclusion criterion was caregiver household income, which was not associated with time to institutionalization ($\chi^2_4 = 2.54$; $p = 0.6367$) or caregiver employment status ($\chi^2_4 = 1.08$; $p = 0.8977$ [logistic]). Another excluded covariate was care-recipient use of more than one caregiver ($\chi^2_1 = 0.04$; $p = 0.8424$).

Two of the eight covariates that were initially included in the multivariable model, care-recipient disease severity and difficulty with behaviors, were found to be correlated with one another and with care-recipient diagnosis. This produced unrealistically high estimated regression coefficients (i.e., > 16.0) for both covariates and prevented the model from converging. Consequently, both covariates were removed from further iterations of the model.

Another three covariates, care-recipient sex, diagnosis, and difficulty with ADLs, were excluded from the multivariable model because their individual removal did not change the regression coefficient for caregiver employment status by at least 10%. The final multivariable model (M1) thus contained caregiver employment status and three covariates (Table 2). Reported for comparative purposes is the model (M2) containing sex, diagnosis, and difficulty with ADLs (Table 2). The AF for employment status is largely unchanged between M1 and M2.

According to M1, care-recipients' time to institutionalization is statistically significantly longer when caregivers are employed versus unemployed (AF: 1.85; 95% CI: 1.08 to 3.16), adjusting for caregiver thoughts about institutionalizing the care-recipient, caregiver health, and the use of a day center to help provide care. In this model, time to institutionalization was shorter when caregivers reported thinking somewhat seriously about institutionalizing their loved one (AF: 0.35; 95% CI: 0.22 to 0.57) or when caregivers used day centers to help provide care (AF: 0.45; 95% CI: 0.22 to 0.91).

M1 uses only 126 out of 326 available caregiver/care-recipient dyads, primarily due to the large amount of missing data on the covariate for use of day centers ($n = 171$ missing values). Consequently, a third model (M3) was developed without the 'day center' covariate (Table 3). M3 drew upon 263 observations; the association between employment status and time to institutionalization was no longer statistically significant (AF: 1.33; 95% CI: 0.98 to 1.79),

although very serious caregiver thoughts about institutionalization became significant (AF: 0.52; 95% CI: 0.36 to 0.76). To see if the change in effect of employment status in M3 resulted from a bias due to missing data or to the removal of ‘day center’ as a confounder, the 326 dyads were stratified according to whether they were included (no missing data [n = 126]) or excluded (missing data for at least one variable [n = 200]) from M1. The distribution of response values for all variables in M1 did not differ by stratum ($p \geq 0.25$ in all comparisons), so the change in effect of employment status was due to removing a confounder rather than to a bias from missing data.

To assess effect modification involving the other covariates in M1 while avoiding model instability, ‘day center’ was removed prior to stratification by employment status. The resulting stratified model (M4) showed that time to institutionalization was slightly faster when employed caregivers thought about institutionalization (Table 3).

Discussion

Caregiver employment status was found to be associated with the time to institutionalization of care-recipients with dementia. For the care-recipients of employed caregivers, the average time to institutionalization was 85% longer than for the care-recipients of unemployed caregivers, adjusting for caregiver thoughts about institutionalizing the care-recipient, caregiver health, and the use of a day center to help provide care. This finding is important because no previous study looked at the impact of caregiver employment on time to institutionalization. Two earlier studies (11,12) examined links between caregiver employment and the desire to institutionalize, but neither examined actual institutionalization.

The evidence indicates that caregiver employment status has an independent effect on time to institutionalization. Other possible explanations of the effect were not supported by the data.

For example, one could argue that caregivers tend to be employed when care-recipients are at the mild stage of disease and able to function with some degree of independence. At this point, caregivers have not had to curtail their employment to devote more time to caring; institutionalization of the care-recipient is still a while away. However, disease severity and difficulty with behaviors were shown to be correlated with diagnosis, which had no effect on the AF for employment status when dropped from the multivariable model. Difficulty with ADLs also had no effect when dropped from the model. Another possible explanation was that employed caregivers were more likely to have the help of others in providing care, thereby permitting them to work. However, there was no association between employment status and the number of caregivers looking after care-recipients. Even income was not associated with either the independent or dependent variable.

One explanation for the association between employed caregivers and a longer time to institutionalization is that working could provide a respite from the stresses and demands of caregiving. Past research into this hypothesis has produced equivocal results. Some studies found employed caregivers to have less stress than unemployed caregivers (22), some found the reverse (23), and some found no association (24). Further research is needed to explain the rationale behind the employment-institutionalization association.

Two covariates were found to be associated with time to institutionalization. Time was shorter when caregivers thought somewhat seriously about institutionalizing their loved one or when day centers were used to help provide care. Time was also shorter when employed (versus unemployed) caregivers thought about institutionalization. Once caregivers start to think about institutionalization, or require the use of a community service such as a day center to help provide care, it could be that the demands of caregiving have progressed to the point where they

are strenuous enough to speed up the time to institutionalization. Research has shown that increased demands on caregivers are associated with institutionalization (6), as are thoughts about institutionalization and the use of community services (3,5).

The median time to institutionalization in this study, i.e., 61 months (1,821 days ÷ 30) when caregivers were working and 51 months (1,542 days ÷ 30) when caregivers were not working, was longer than the 41 (5) or 42 (25) months reported in two other studies of persons with dementia. The discrepancies relate to differences in study methodology and sampling. In a study using CSHA data (5), missing dates of death or institutionalization were imputed by identifying the midpoint of a range of plausible dates (26). The validity of this imputation scheme has not been assessed, so the resulting 41-month estimate of median time to institutionalization may not be a closer approximation of the true population median than the estimates in this study. The 42-month estimate (25) was based on a sample restricted to persons with AD (27). Shorter times to institutionalization have been shown to be associated with a diagnosis of AD (5). Consequently, the time in this study could have been longer because the sample contains persons with other dementias in addition to persons with AD.

This study has several strengths. First, it is based on a representative sample from a population-level, longitudinal cohort of seniors with dementia. Second, several covariates were examined to better understand the association between caregiver employment status and time to institutionalization. Third, standardized instruments were used to assess study participants, thereby increasing the validity of the data (5).

In conclusion, the employment status of caregivers was found to have an effect on the time to institutionalization of care-recipients with dementia. This effect was evident when employment status was adjusted for three covariates (see M1): caregiver thoughts about institutionalizing the

care-recipient, caregiver health, and caregiver's use of day centers. This finding is the first to establish the existence of an effect between caregiver employment status and care-recipient institutionalization.

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Table 1. Sample Characteristics

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Caregiver Sex		
Male	25 (25)	45 (20)
Female	74 (75)	182 (80)
Caregiver Age	50 (45 to 58) years	68 (58 to 75) years; missing = 3
Caregiver Lives with Care-recipient		
Yes	35 (35)	162 (71)
No	64 (65)	65 (29)
Caregiver Annual Household Income		
Less than \$20,000	10 (10)	27 (12)
\$20,000 - \$29,999	16 (16)	31 (14)
\$30,000 - \$39,999	13 (13)	30 (13)
\$40,000 - \$69,999	19 (19)	54 (24)
\$70,000 or more	14 (14)	39 (17)
Missing	27 (27)	45 (20)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Caregiver Thought About Institutionalizing Care-recipient		
Not at all	40 (40)	113 (50)
Not seriously	15 (15)	43 (19)
Somewhat seriously	26 (26)	38 (17)
Very seriously	16 (16)	26 (11)
Missing	2 (2)	7 (6)
Caregiver Burden		
ZBI ≤ 27	66 (67)	141 (62)
ZBI > 27	31 (31)	73 (32)
Missing	2 (2)	13 (6)
Caregiver Depression		
CES-D ≤ 11	78 (78)	141 (62)
CES-D > 11	21 (21)	80 (35)
Missing	0 (0)	6 (3)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Caregiver Health		
Very good	50 (51)	62 (27)
Pretty good	45 (45)	119 (52)
Not too good or poor	3 (3)	35 (15)
Missing	1 (1)	11 (5)
Use of Formal Service – Homemaker		
Yes	16 (16)	38 (17)
No	30 (30)	71 (31)
Missing	53 (54)	118 (52)
Use of Formal Service – Meals		
Yes	7 (7)	9 (4)
No	39 (39)	100 (44)
Missing	53 (54)	118 (52)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Use of Formal Service – Help		
Yes	7 (7)	16 (8)
No	39 (39)	93 (41)
Missing	53 (54)	118 (52)
Use of Formal Service – Nursing		
Yes	9 (9)	17 (7)
No	37 (37)	92 (41)
Missing	53 (54)	118 (52)
Use of Formal Service – Physiotherapy		
Yes	4 (4)	4 (4)
No	35 (35)	87 (38)
Missing	60 (61)	136 (60)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Use of Formal Service – Day Center		
Yes	1 (1)	10 (4)
No	45 (45)	99 (44)
Missing	53 (54)	118 (52)
Use of Formal Service – Respite		
Yes	1 (1)	2 (1)
No	45 (45)	107 (47)
Missing	53 (54)	118 (52)
Use of Formal Service – Counsel		
Yes	2 (2)	6 (3)
No	44 (44)	103 (45)
Missing	53 (54)	118 (52)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Use of Formal Service – Support Group		
Yes	2 (2)	2 (1)
No	44 (44)	107 (47)
Missing	53 (54)	118 (52)
Caregiver Relationship to Care-recipient		
Spouse	33 (33)	77 (34)
Child	39 (39)	109 (48)
Other (e.g., siblings, relatives, friends)	27 (27)	41 (18)
Parent	0 (0)	0 (0)
Caregiver/Care-recipient Region of Residence		
Atlantic Region	20 (20)	45 (20)
Québec	21 (21)	42 (19)
Ontario	18 (18)	29 (13)
Prairie Region	9 (9)	43 (19)
British Columbia	14 (14)	37 (16)
Missing	17 (17)	31 (14)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Care-recipient Sex		
Male	25 (25)	103 (45)
Female	74 (75)	124 (55)
Care-recipient Age	85 (80 to 87) years	83 (78 to 88) years
Care-recipient Diagnosis		
Probable or Possible AD	66 (67)	149 (66)
Vascular Dementia	19 (19)	50 (22)
Other Dementia (e.g., Parkinson's Disease)	14 (14)	28 (12)
Care-recipient Severity of Disease		
Mild	43 (43)	91 (40)
Moderate	30 (30)	102 (45)
Severe	11 (11)	20 (9)
Missing	15 (15)	14 (6)

Table 1. Sample Characteristics (Continued)

Variable	Number (%) [*] or Median (25 th to 75 th Percentile Range) [†]	
	Caregiver Employment Status	
	Yes (n = 99)	No (n = 227)
Care-recipient's Number of Caregivers		
More than 1 caregiver	26 (26)	57 (25)
Just 1 caregiver	70 (71)	152 (67)
Missing	3 (3)	18 (8)
Care-recipient Difficulty with Behaviors		
Difficulty with > 2 behaviors	4 (2)	3 (1)
Difficulty with 1 – 2 behaviors	24 (11)	62 (27)
No difficulty with any behaviors	69 (30)	153 (67)
Missing	2 (1)	9 (4)
Care-recipient Difficulty with ADLs		
Difficulty with > 4 ADLs	42 (19)	118 (52)
Difficulty with 3 – 4 ADLs	23 (10)	48 (21)
No difficulty with ≤ 2 ADLs	29 (13)	51 (22)
Missing	5 (2)	10 (4)

Note: Some percentages may not add to 100 due to rounding error.

ZBI = Zarit Burden Interview; CES-D = Center for Epidemiologic Studies Depression Scale.

AD = Alzheimer's disease; ADLs = activities of daily living.

*Categorical variables.

†Continuous variables.

Table 2. Accelerated Failure Time Models for Caregiver Employment Status and Time to Institutionalization

Variable	Acceleration Factor (95% Confidence Interval)	
	Model 1 (M1) (n = 126)	Model 2 (M2) (n = 123)
Caregiver Currently Works for Pay		
Yes	1.85 (1.08-3.16)	1.88 (1.09-3.24)
No	1.00 (Reference)	1.00 (Reference)
Caregiver Thought About Institutionalizing Care-recipient		
Very seriously	0.76 (0.37-1.54)	0.87 (0.42-1.80)
Somewhat seriously	0.35 (0.22-0.57)	0.39 (0.23-0.66)
Not seriously	0.86 (0.48-1.55)	0.81 (0.43-1.50)
Not at all	1.00 (Reference)	1.00 (Reference)
Caregiver Health		
Very good	1.32 (0.72-2.40)	1.46 (0.78-2.73)
Pretty good	1.32 (0.77-2.27)	1.41 (0.80-2.47)
Not too good or poor	1.00 (Reference)	1.00 (Reference)

Table 2. Accelerated Failure Time Models for Caregiver Employment Status and Time to Institutionalization (Continued)

Variable	Acceleration Factor (95% Confidence Interval)	
	Model 1 (M1) (n = 126)	Model 2 (M2) (n = 123)
Use of Formal Service – Day Center		
Yes	0.45 (0.22-0.91)	0.44 (0.20-0.96)
No	1.00 (Reference)	1.00 (Reference)
Care-recipient Sex		
Female	NIM	0.86 (0.56-1.32)
Male	NIM	1.00 (Reference)
Care-recipient Diagnosis		
Probable or possible AD	NIM	0.64 (0.34-1.20)
Vascular dementia	NIM	0.65 (0.30-1.43)
Other dementia	NIM	1.00 (Reference)
Care-recipient Difficulty with ADLs		
Difficulty with > 4 ADLs	NIM	0.83 (0.50-1.39)
Difficulty with 3 – 4 ADLs	NIM	1.08 (0.58-2.01)
Difficulty with ≤ 2 ADLs	NIM	1.00 (Reference)

AD = Alzheimer's disease; NIM = not in model; ADLs = activities of daily living.

Table 3. Accelerated Failure Time Models for Caregiver Employment Status and Time to Institutionalization

Variable	Acceleration Factor (95% Confidence Interval)		
	Model 3 (M3) (n = 263)	Model 4 (M4) (n = 263)*	
		Employed – Yes (n = 80)	Employed – No (n = 183)
Caregiver Currently Works for Pay			
Yes	1.33 (0.98-1.79)	Stratification variable	
No	1.00 (Reference)	Stratification variable	
Caregiver Thought About Institutionalizing Care-recipient			
Very seriously	0.52 (0.36-0.76)	0.42 (0.20-0.89)	0.56 (0.36-0.88)
Somewhat seriously	0.46 (0.34-0.63)	0.39 (0.20-0.75)	0.48 (0.34-0.69)
Not seriously	0.73 (0.52-1.04)	0.42 (0.20-0.87)	0.86 (0.57-1.29)
Not at all	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Caregiver Health			
Very good	1.27 (0.87-1.86)	1.33 (0.48-3.72)	1.27 (0.82-1.96)
Pretty good	1.27 (0.89-1.81)	1.50 (0.53-4.26)	1.22 (0.83-1.79)
Not too good or poor	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)

*M4 is stratified by caregiver employment status.

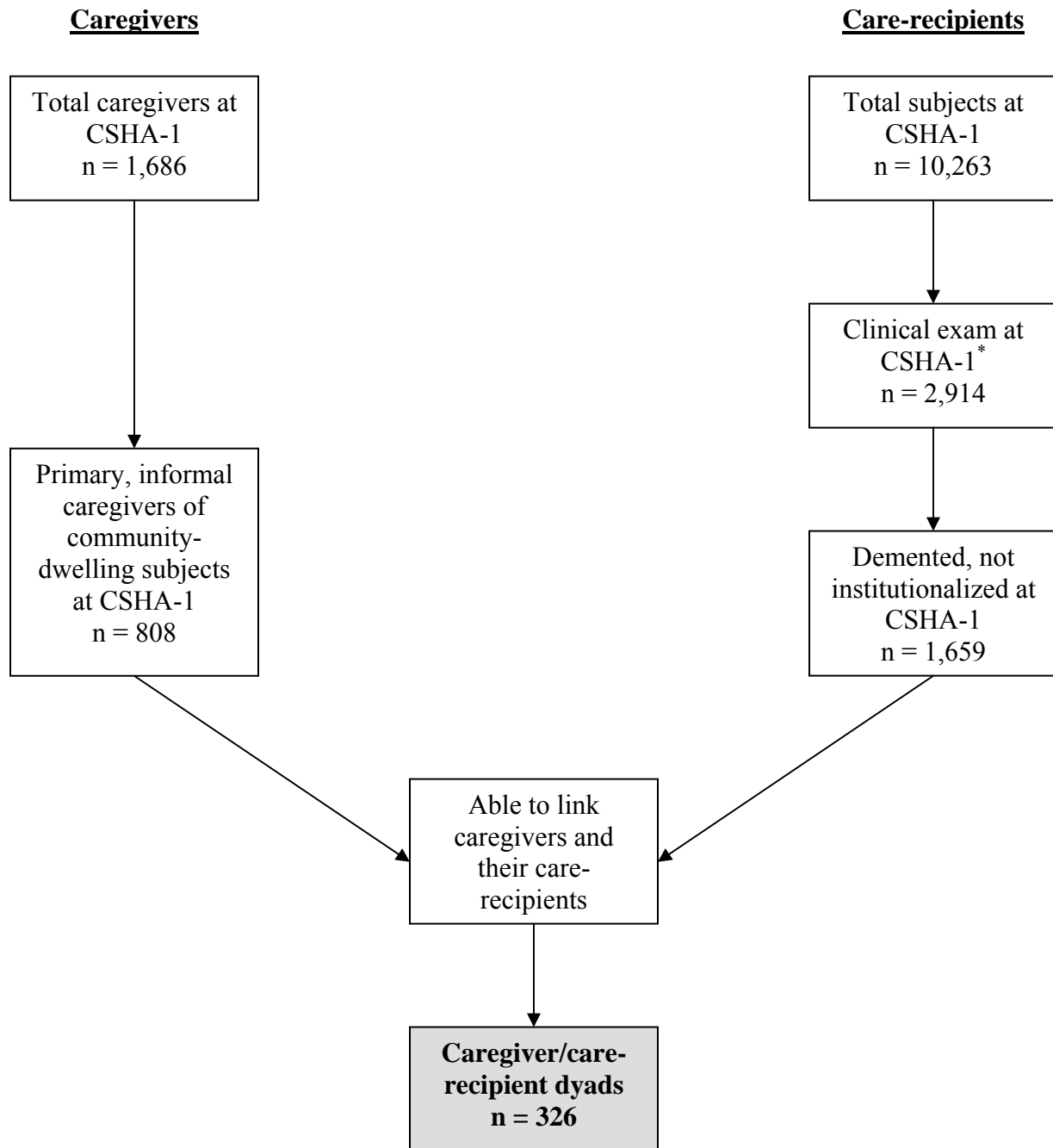


Figure 1. Identification of caregiver/care-recipient dyads in the CSHA database.

CSHA = Canadian Study of Health and Aging; * subjects with a score below 78 on the Modified Mini-Mental State Examination (3MS) were sent for a clinical exam, as were a random sample of subjects who scored 78 or above.

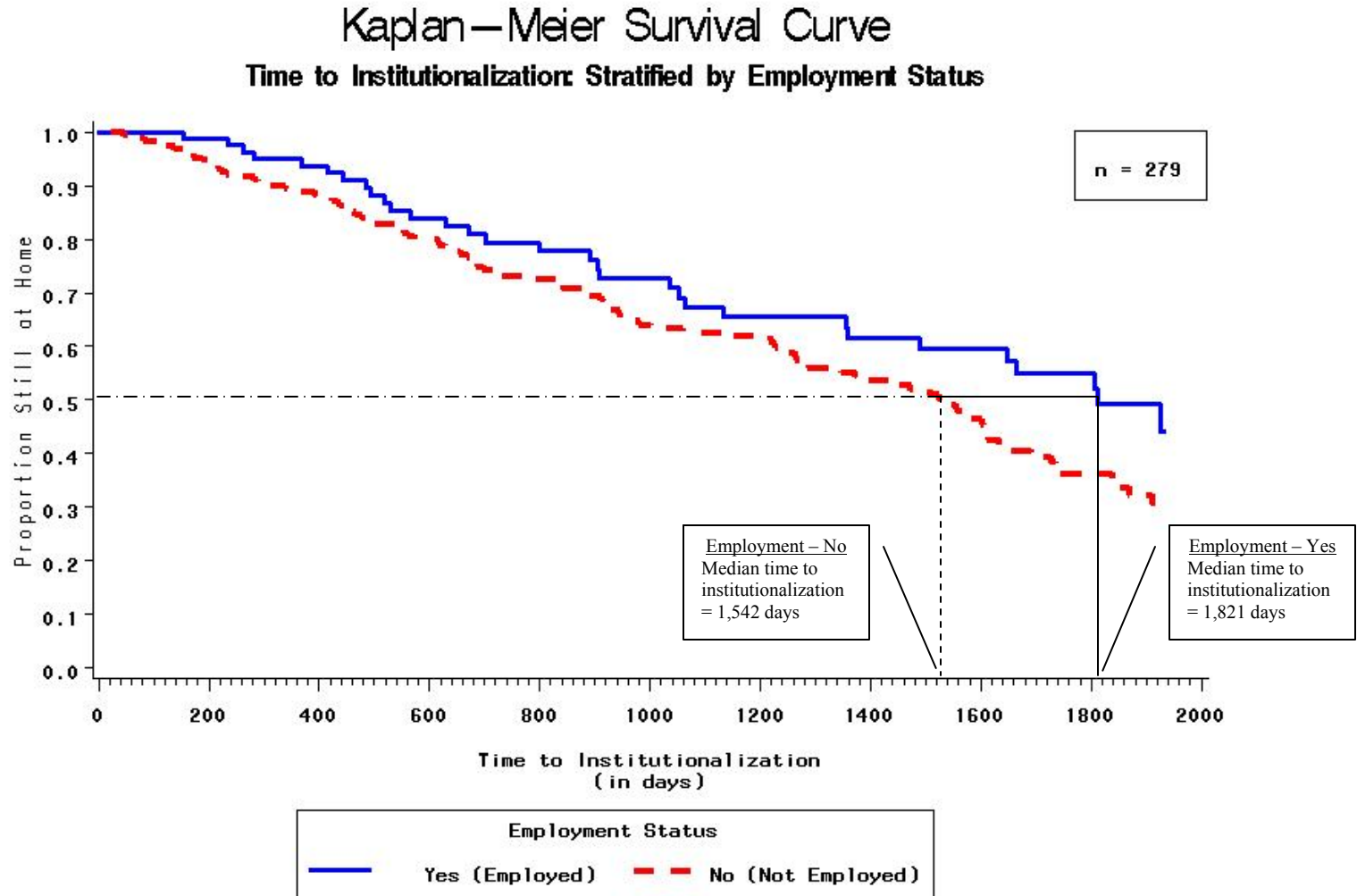


Figure 2. Kaplan-Meier survival curve for time to institutionalization stratified by caregiver employment status (n = 279).

Note: Missing date values prevented the computation of time to institutionalization for 47 caregiver/care-recipient dyads.

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