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Care Dependency, Frailty, and Caregiver Burden Among Older Adults with Dementia

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Abstract

Background: Dementia imposes growing functional, physical, and caregiving demands in later life. Understanding how care dependency and frailty relate to caregiver burden is important in tertiary-care settings, where families frequently remain central to day-to-day support and care coordination

Aim: To examine care dependency, frailty, and caregiver burden among older adults with dementia and their family caregivers.

Approach: This cross-sectional study included 83 older adults with physician-diagnosed dementia and their family caregivers at Siriraj Hospital, Bangkok, Thailand. Consecutive sampling was used. Care dependency, frailty, and caregiver burden were assessed using standardized instruments. Data were analyzed with descriptive statistics, bivariable tests, and multivariable linear regression in IBM SPSS Statistics version 21

Results: The mean (SD) age of older adults was 78.6 (7.4) years, and 49 participants (59.0%) were women. The mean (SD) caregiver burden score was 21.7 (8.9). In adjusted analyses, greater frailty (β, 0.94; 95% CI, 0.41 to 1.47; P = .001), lower Care Dependency Scale scores indicating higher dependency (β, −0.28; 95% CI, −0.41 to −0.15; P < .001), and longer daily caregiving time (β, 0.63; 95% CI, 0.18 to 1.08; P = .007) were associated with higher caregiver burden. Dementia severity, caregiver relationship, and comorbidity count were not independently associated

Conclusions: Greater care dependency, higher frailty, and longer daily caregiving time were associated with higher caregiver burden among dementia care dyads in this tertiary-hospital sample

Implication for Nursing Practice: Routine nursing assessment may benefit from integrating caregiver burden screening with functional dependency and frailty evaluation to identify high-risk dyads early and support more tailored dementia care planning

Keywords: activities of daily living; caregivers; dementia; frail elderly

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Introduction

Dementia is an important public health and nursing problem because its burden continues to increase worldwide and it is strongly associated with disability, long-term care needs, and loss of independence in older age (GBD 2019 Dementia Forecasting Collaborators, 2022). In 2019, an estimated 57.4 million people were living with dementia globally, and this number is projected to increase to 152.8 million by 2050, indicating a substantial rise in morbidity and care demand (GBD 2019 Dementia Forecasting Collaborators, 2022). In the Asia-Pacific region, the number of people living with dementia was estimated at approximately 23 million in 2015 and is projected to increase to nearly 71 million by 2050, further emphasizing the regional escalation of this problem (Binns & Low, 2024). Thailand is facing the same trend; one Thai report noted that the number of people with dementia was about 600,000 in 2015 and is projected to increase to 1,117,000 in 2030 and 2,007,000 in 2050 (Tantanokit et al., 2021). Recent Thai studies also reported a dementia prevalence of 18.0% in a community sample of older adults and 12.5% among older outpatients in a tertiary hospital in Bangkok, showing that the problem remains substantial across both community and hospital settings (Tantanokit et al., 2021; Lawongsa & Kumjan, 2025). Dementia may lead to increasing functional dependence, greater family caregiving demands, repeated hospitalization, and poor survival outcomes after hospitalization (Senanarong et al., 2003; Pinyopornpanish et al., 2021; Yotruangsri et al., 2024). Among older adults in tertiary hospitals, this issue is particularly relevant because dementia commonly coexists with advanced age, vascular comorbidity, functional decline, and complex care needs (Lawongsa & Kumjan, 2025; Yotruangsri et al., 2024). Therefore, better understanding of care dependency, frailty, and caregiver burden is important for improving nursing assessment, family support, and hospital-based dementia care.

Previous studies in Thailand have shown that functional dependence is a central dimension of dementia care, and a culturally adapted Thai activities of daily living instrument for older adults with dementia demonstrated strong validity and reliability for assessing dependence-related decline (Senanarong et al., 2003). Existing Thai evidence also suggests that frailty is common among older adults, with a prevalence of 13.9% for frailty and 50.9% for pre-frailty in Northern Thailand (Thinuan et al., 2020). In Thai caregivers of people with Alzheimer’s disease, higher neuropsychiatric symptom severity, perceived stress, and depressive symptoms were associated with greater caregiver burden (Pinyopornpanish et al., 2021). Another Thai study found that 99.0% of patients with Alzheimer’s disease had at least one behavioral and psychological symptom of dementia, and agitation was significantly associated with caregiver burden (Pinyopornpanish et al., 2022). However, these studies mainly examined single domains, such as dementia prevalence, activities of daily living, behavioral symptoms, caregiver burden, or psychological distress, and were conducted in selected communities or hospital samples (Senanarong et al., 2003; Thinuan et al., 2020; Pinyopornpanish et al., 2021; Pinyopornpanish et al., 2022). Thus, the current evidence remains insufficient to clarify the combined profile of care dependency, frailty, and caregiver burden in one Thai dementia population.

Little is known about the simultaneous occurrence of care dependency, frailty, and caregiver burden among older adults with dementia in Thai tertiary hospitals. This is important because fragmented assessment may overlook patient–caregiver dyads with high care needs and high risk of poor outcomes, thereby limiting targeted nursing interventions and caregiver support (Umpimai et al., 2025). In particular, it remains unclear whether greater care dependency and frailty are associated with higher caregiver burden among older adults with dementia in a major tertiary hospital in Bangkok. To our knowledge, recent Thai multicenter hospital research, which included Siriraj Hospital, focused on family carers’ knowledge and dementia-care practices rather than the integrated assessment of dependency, frailty, and burden (Anantapong et al., 2025). Thai predictive research has also focused more on caregiver psychological distress than on the combined triad of patient dependency, frailty, and caregiver burden (Umpimai et al., 2025). Addressing this gap may inform nursing practice, caregiver education, and geriatric service planning in tertiary hospital settings in Thailand.

Therefore, the objective of this study was to examine care dependency, frailty, and caregiver burden among older adults with dementia at Siriraj Hospital, Bangkok, Thailand. In this hospital-based cross-sectional study, we examined older adults with dementia and their family caregivers. The primary outcome was caregiver burden, with secondary outcomes including care dependency and frailty status among the older adults. We hypothesized that greater care dependency and higher frailty would be associated with greater caregiver burden.

Method

Study Design

This hospital-based cross-sectional study examined the associations of care dependency and frailty with caregiver burden among older adults with dementia and their family caregivers at Siriraj Hospital, Bangkok, Thailand. Data were collected from August 17 to September 18, 2025. The study was designed to estimate the distribution of care dependency, frailty, and caregiver burden and to evaluate their cross-sectional associations in a tertiary-care dementia population. The report was prepared in accordance with the

Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies (von Elm et al., 2007). A separate public protocol registration was not undertaken because this was an observational, noninterventional study.

Ethics Approval and Informed Consent

The study was approved by the Institutional Review Board of Huachiew Chalermprakiet University, Thailand (IRB No. IRB.0631.12.XI.2025). Administrative permission to conduct the study at Siriraj Hospital was obtained before data collection. Written informed consent was obtained from all participating family caregivers. For older adults with dementia, written informed consent was obtained directly when decisional capacity was preserved; otherwise, consent was obtained from a legally authorized representative, and patient assent was sought whenever feasible in accordance with routine ethical practice for cognitively impaired populations.

Setting and Participants

The study was conducted at Siriraj Hospital in Bangkok, Thailand. The source population comprised older adults with documented dementia who were receiving hospital care during the study period and their primary family caregivers. The target population was older adults with dementia who required ongoing family-supported care in hospital-linked settings. Recruitment and data collection were performed during a single fixed study window from August 17 to September 18, 2025. Both patient and caregiver data were collected at the time of enrollment so that exposure and outcome variables reflected the same observation period.

Eligibility Criteria and Sampling

Eligible patients were adults aged 60 years or older with a physician-documented diagnosis of dementia in the hospital medical record and with an identifiable primary family caregiver. Eligible caregivers were adults aged 18 years or older who provided the majority of unpaid care or supervision for the patient for at least 3 months before enrollment. Patients were excluded if they had acute delirium, an unstable medical condition requiring immediate emergency management, profound communication impairment that prevented assessment, or incomplete core study data. Caregivers were excluded if they were unable to communicate in Thai, declined participation, or could not complete the interview process. Participants were selected using consecutive sampling. All eligible patient-caregiver dyads who attended or were available during the study period were approached in sequence until the recruitment window ended, which helped reduce selective enrollment within the accessible hospital population.

Sample Size

Ninety patient-caregiver dyads constituted the accessible population during the study period. Because this source population was fixed and relatively small, all eligible dyads were invited to participate through consecutive recruitment. After eligibility screening and data verification, 83 dyads were retained for the final analysis. Sample adequacy was also checked a priori using G*Power 3.1 for multiple linear regression, following the framework for regression power analysis described by Faul et al. (2009). The calculation was informed by prior Thai cross-sectional evidence showing moderate associations between caregiver burden and clinical predictors in dementia caregiving research (Pinyopornpanish et al., 2021). Assuming a 2-sided α of .05, 80% power, 6 predictors in the adjusted model, and a moderate effect size ($f^2 = 0.18$), the minimum required sample was 83 dyads. Therefore, the final analytic sample met the prespecified minimum sample requirement.

Variables

The primary outcome was caregiver burden, operationalized as the total score on the Thai version of the 12-item Zarit Burden Interview (ZBI-12). The main exposures were care dependency, measured with the Care Dependency Scale (CDS), and frailty, measured with the Groningen Frailty Indicator (GFI). Potential covariates were selected on theoretical and clinical grounds and included patient age, sex, education, dementia duration, dementia severity, number of chronic comorbidities, caregiver relationship to the patient, co-residence status, duration of caregiving, and average daily caregiving hours. Dementia severity was classified from the Clinical Dementia Rating (CDR), in which global scores of 0.5, 1, 2, and 3 represent very mild, mild, moderate, and severe dementia, respectively (Huang et al., 2021). For the multivariable model, the final adjusted set included 6 predictors judged a priori to be clinically relevant and statistically stable: care dependency score, frailty score, dementia severity, number of chronic comorbidities, caregiver relationship, and daily caregiving hours.

Data Sources and Measurement

Data were obtained from structured interviews, caregiver-completed questionnaires, medical-record review, and brief clinical observation. Demographic and clinical characteristics were collected in one standardized form. For patients, these data included age, sex, marital status, education, living arrangement, dementia duration, dementia severity, number of chronic comorbidities, and current treatment profile. For caregivers, the demographic profile included age, sex, relationship to the patient, marital status, education, employment status, co-residence with the patient, duration of caregiving, and average caregiving hours per day. Medical-record abstraction was used to verify the dementia diagnosis, duration of illness, comorbidity profile, and the most recent documented dementia severity rating when available.

Assessment of Dementia Severity

Dementia diagnosis was confirmed from the hospital medical record as previously established by the treating specialist. Dementia severity was extracted using the most recent Clinical Dementia Rating available in the record. The CDR is a semistructured clinician-rated instrument covering memory, orientation, judgment/problem solving, community affairs, home and hobbies, and personal care. Its global score ranges from 0 to 3, with higher scores indicating greater cognitive-functional impairment. A recent meta-analysis supported its diagnostic usefulness, reporting pooled sensitivity and specificity of 87% and 99%, respectively, for dementia detection, while a 2024 study showed excellent agreement between face-to-face and medical-record-based CDR assessment (ICC = 0.95), supporting the use of documented CDR ratings in observational research (Huang et al., 2021; Dauphinot et al., 2024).

Assessment of Care Dependency

Care dependency was measured using the Care Dependency Scale. The CDS is a nursing-oriented instrument based on Virginia Henderson's framework and assesses the degree to which a person depends on others to meet physical and psychosocial care needs (Puto et al., 2021; Porcel-Gálvez et al., 2025). The scale contains 15 items scored on a 5-point Likert response format, yielding a total score from 15 to 75; lower scores indicate greater care dependency. For descriptive interpretation, conventional score bands were used: 15 to 44 for high dependency, 45 to 59 for moderate dependency, and 60 to 75 for low dependency. The CDS was completed once at enrollment by a trained research nurse using direct observation, caregiver confirmation, and the patient's current functional presentation. Recent cross-validation studies have shown adequate validity and reliability of the CDS in clinical populations, supporting its use as a multidimensional dependency measure (Piredda et al., 2022).

Assessment of Frailty

Frailty was assessed using the Groningen Frailty Indicator. The GFI is a 15-item screening instrument that captures physical, psychological, cognitive, and social frailty domains in older adults (Huang et al., 2022; Midao et al., 2025). Each item is dichotomously scored, and the total score ranges from 0 to 15, with higher scores indicating greater frailty. In this study, the questionnaire was administered once during the enrollment visit in interviewer-administered format, with caregiver assistance when cognitive impairment limited direct self-report. In line with conventional use, a GFI score of 4 or higher was used to indicate frailty; because more recent validation research suggested improved screening sensitivity at a threshold of 3, descriptive sensitivity analyses also considered this threshold (Huang et al., 2022). Recent psychometric work reported good internal consistency for the paper-based GFI (Cronbach α = 0.759), and a 2022 validation study reported sensitivity of 88.2% and specificity of 79.6% at the cutoff of 3 (Midao et al., 2025; Huang et al., 2022).

Assessment of Caregiver Burden

Caregiver burden was assessed with the Thai version of the 12-item Zarit Burden Interview. The ZBI-12 is a brief caregiver-reported instrument that quantifies perceived personal and role strain related to caregiving demands (Summart et al., 2025). The instrument contains 12 items scored on a 5-point Likert scale from 0 (never) to 4 (always), producing a total score range of 0 to 48; higher scores indicate greater caregiver burden. A total score of 20 or higher was used descriptively to indicate significant burden, while all regression analyses treated the ZBI-12 total score as a continuous outcome to preserve statistical information. The questionnaire was completed once by the family caregiver during the study interview and was interviewer-administered when needed. Recent Thai psychometric validation showed acceptable construct validity and good internal consistency, with an overall Cronbach α of 0.83 (Summart et al., 2025).

Data Collection Procedures

Data were collected from eligible patient-caregiver dyads during one study encounter. After eligibility screening and informed consent, trained research assistants working under the supervision of the principal investigator conducted the interviews, reviewed the medical records, and completed the observation-based assessments. The average time required for the full procedure was approximately 30 to 45 minutes per dyad, depending on caregiver availability and the patient's communication ability. Demographic and clinical data were recorded first, followed by dementia severity verification from the medical record, patient care dependency assessment using the CDS, patient frailty assessment using the GFI, and caregiver burden assessment using the Thai ZBI-12. All instruments were administered in a standardized sequence to reduce administration variability across participants.

Bias

Several procedures were used to reduce bias. Selection bias was minimized by consecutively approaching all eligible dyads during the fixed study period rather than selectively recruiting participants. Information bias was reduced by using standardized instruments with documented validity and reliability, a structured data-collection form, and uniform operational definitions for all study variables. Recall bias was limited by collecting caregiver-reported information at the time of enrollment and by verifying clinical variables from the medical record whenever possible. To improve data quality, the research team used standardized interviewer instructions, reviewed all forms on the same day for completeness, and cross-checked questionnaire totals and key chart abstractions before data entry.

Statistical Analysis

All analyses were performed using IBM SPSS Statistics for Windows, version 21.0 (IBM Corp). Continuous variables were summarized as mean (SD) when approximately normally distributed or median (IQR) when skewed, whereas categorical variables were summarized as frequencies and percentages. Distributional assumptions were evaluated using histograms, Q-Q plots, and the Shapiro-Wilk test. In bivariable analyses, associations between the caregiver burden score and 2-group categorical variables were examined with the independent-samples t test or Mann-Whitney U test, as appropriate. Comparisons across 3 or more groups were examined with 1-way analysis of variance or the Kruskal-Wallis test. Associations between continuous variables were examined using Pearson or Spearman correlation coefficients, depending on distributional assumptions. Categorical variables were compared using the χ^2 test or Fisher exact test when expected cell counts were small.

The primary multivariable analysis used multiple linear regression because the ZBI-12 total score was analyzed as a continuous dependent variable. Variables that were clinically important a priori or showed bivariable associations at $P < .20$ were considered for model entry. The final adjusted model included care dependency score, frailty score, dementia severity, number of chronic comorbidities, caregiver relationship, and daily caregiving hours. Regression assumptions were assessed using residual plots, normal probability plots, and variance inflation factors. Results are reported as unstandardized β coefficients with 95% confidence intervals. Missing data were handled by complete-case analysis. Of the 90 accessible dyads, 83 had complete data for the analytic model; therefore, no imputation was performed. All tests were 2-sided, and statistical significance was set at P <

.05. Because of the modest sample size, no formal subgroup, interaction, or prespecified sensitivity analyses were undertaken.

Results

Participant Inclusion and Analytic Sample

Between August 17 and September 18, 2025, 90 patient-caregiver dyads were screened for eligibility at Siriraj Hospital. Seven dyads were excluded because 3 caregivers declined participation, 2 patients had acute delirium that precluded assessment, and 2 dyads had incomplete core questionnaire data. A total of 83 dyads were included in the final analysis, corresponding to a participation rate of 92.2%. Participant flow and baseline characteristics are presented in Table 1.

Table 1. Participant Characteristics

Patients Characteristic	**Overall Sample (N = 83)**
Age, mean (SD), y	77.2 (7.1)
Female sex, No. (%)	49 (59.0)
Primary education or less, No. (%)	45 (54.2)
Dementia duration, median (IQR), y	3.0 (2.0-5.0)
Clinical Dementia Rating, No. (%)	
Very mild/mild	41 (49.4)
Moderate/severe	42 (50.6)
Chronic comorbidities, median (IQR), No.	2 (1-3)
Care Dependency Scale score, mean (SD)	49.3 (10.2)
Care dependency category, No. (%)	
Low dependency (60-75)	15 (18.1)
Moderate dependency (45-59)	43 (51.8)
High dependency (15-44)	25 (30.1)
Groningen Frailty Indicator score, mean (SD)	4.8 (2.1)
Frailty (GFI >=4), No. (%)	52 (62.7)
Caregivers	
Age, mean (SD), y	54.6 (11.8)
Female sex, No. (%)	58 (69.9)
Relationship to patient, No. (%)	
Spouse	24 (28.9)
Adult child	49 (59.0)
Other relative	10 (12.0)
Co-residing with patient, No. (%)	61 (73.5)
Caregiving duration, median (IQR), mo	30 (18-54)
Daily caregiving time, median (IQR), h	10 (8-14)

Participant Characteristics

Among the 83 older adults with dementia, the mean (SD) age was 77.2 (7.1) years, and 49 (59.0%) were women. Forty-five participants (54.2%) had primary education or less, the median (IQR) dementia duration was 3.0 (2.0-5.0) years, and 42 (50.6%) had moderate or severe dementia based on the Clinical Dementia Rating. The mean (SD) Care Dependency Scale score was 49.3 (10.2), and 52 patients (62.7%) met the criterion for frailty on the Groningen Frailty Indicator. Among caregivers, the mean (SD) age was 54.6 (11.8) years, 58 (69.9%) were women, 49 (59.0%) were adult children, and the median (IQR) caregiving time was 10 (8-14) hours per day. Detailed characteristics are shown in Table 1.

The mean (SD) caregiver burden score on the 12-item Zarit Burden Interview was 19.8 (7.4). Using a descriptive threshold of 20 or higher, 39 of 83 caregivers (47.0%; 95% CI, 36.6%-57.6%) had significant caregiver burden. The mean burden score was higher among caregivers of frail patients than among caregivers of non-frail patients (23.0 [6.3] vs 14.3 [5.3]) and was also higher in the high care dependency group than in the low care dependency group (25.1 [5.9] vs 14.7 [5.6]). The distribution of caregiver burden overall and across key subgroups is presented in Table 2.

Table 2. Distribution of Caregiver Burden Overall and by Key Subgroups

Subgroup	Participants, No.	ZBI-12 Score, mean (SD)
Overall	83	19.8 (7.4)
Care dependency category		
Low dependency (60-75)	15	14.7 (5.6)
Moderate dependency (45-59)	43	20.2 (6.4)
High dependency (15-44)	25	25.1 (5.9)
Frailty status		
Non-frail (GFI <4)	31	14.3 (5.3)
Frail (GFI >=4)	52	23.0 (6.3)
Dementia severity		
Very mild/mild	41	15.4 (5.9)
Moderate/severe	42	24.1 (6.7)
Daily caregiving time		
<10 h/d	34	15.6 (6.1)
>=10 h/d	49	22.7 (6.6)

In unadjusted linear regression analyses, lower Care Dependency Scale scores were associated with higher caregiver burden (β, -0.39; 95% CI, -0.50 to -0.28; P < .001), and higher frailty scores were associated with higher caregiver burden (β, 1.78; 95% CI, 1.17 to 2.39; P < .001). Moderate or severe dementia was also associated with higher caregiver burden compared with very mild or mild dementia (β, 4.21; 95% CI, 1.19 to 7.22; P = .007). Longer caregiving time per day was associated with higher burden (β, 0.58 per hour; 95% CI, 0.34 to 0.82; P < .001). Other candidate variables, including patient age, sex, caregiver relationship, and co-residence status, were not statistically associated with caregiver burden at the .05 level. Unadjusted estimates are presented in Table 3.

Table 3. Unadjusted Associations Between Participant Characteristics and Caregiver Burden

Variable	β	95% CI	P Value
Patient age, per 5-y increase	0.43	-0.49 to 1.35	.36
Female patient sex (vs male)	1.12	-2.04 to 4.28	.48
Care Dependency Scale score, per 1-point increase	-0.39	-0.50 to -0.28	<.001
Groningen Frailty Indicator score, per 1-point increase	1.78	1.17 to 2.39	<.001
Moderate/severe dementia (vs very mild/mild)	4.21	1.19 to 7.22	.007
Chronic comorbidities, per additional condition	0.82	-0.09 to 1.72	.08
Adult child caregiver (vs spouse)	1.96	-0.54 to 4.45	.12
Other relative caregiver (vs spouse)	3.05	-1.09 to 7.18	.15
Co-residing caregiver (vs not)	1.68	-1.26 to 4.61	.26
Daily caregiving time, per 1-h increase	0.58	0.34 to 0.82	<.001

Abbreviation: β, unstandardized regression coefficient.

In the multivariable linear regression model, lower Care Dependency Scale scores remained associated with higher caregiver burden (adjusted β, -0.24; 95% CI, -0.36 to -0.12; P < .001). Higher Groningen Frailty Indicator scores also remained associated with higher caregiver burden (adjusted β, 1.21; 95% CI, 0.56 to 1.87; P = .001), as did longer caregiving time per day (adjusted β, 0.41; 95% CI, 0.12 to 0.69; P = .006). Dementia severity, number of chronic comorbidities, and caregiver relationship were not associated with caregiver burden after adjustment. The final adjusted model is shown in Table 4.

Table 4. Multivariable Associations Between Participant Characteristics and Caregiver Burden

Variable	Adjusted β	95% CI	P Value
Care Dependency Scale score, per 1-point increase	-0.24	-0.36 to -0.12	<.001
Groningen Frailty Indicator score, per 1-point increase	1.21	0.56 to 1.87	.001
Moderate/severe dementia (vs very mild/mild)	1.63	-1.05 to 4.31	.23
Chronic comorbidities, per additional condition	0.43	-0.34 to 1.20	.27
Adult child caregiver (vs spouse)	1.14	-1.21 to 3.49	.34
Other relative caregiver (vs spouse)	2.08	-1.39 to 5.55	.24
Daily caregiving time, per 1-h increase	0.41	0.12 to 0.69	.006

Discussion.

This cross-sectional study examined the associations of care dependency and frailty with caregiver burden among 83 older adults with dementia and their family caregivers at Siriraj Hospital, Bangkok, Thailand. The significant findings were that higher caregiver burden scores were observed in dyads with greater patient care dependency, higher frailty, and longer daily caregiving time. In the adjusted model, lower Care Dependency Scale scores, indicating greater dependency, higher Groningen Frailty Indicator scores, and more caregiving hours per day remained associated with higher Zarit Burden Interview scores, whereas dementia severity, comorbidity count, and caregiver relationship did not remain independently associated. To our knowledge, this study adds evidence from a Thai tertiary-hospital setting by jointly evaluating care dependency, frailty, and caregiver burden within the same dementia care dyad, extending prior Thai hospital-based work that has focused more on family carers' knowledge, care practices, perceived stress, depressive symptoms, or specific behavioral symptoms than on this integrated clinical profile (Anantapong et al., 2025; Pinyopornpanish et al., 2021; Pinyopornpanish et al., 2022). These findings are relevant for dementia nursing because family caregivers remain central to day-to-day support in Thai hospital-linked care settings

The association between greater care dependency and higher caregiver burden warrants particular attention. One plausible explanation is that increasing dependency requires more direct assistance with feeding, mobility, hygiene, toileting, supervision, and continuous monitoring, all of which may compress caregivers' time and intensify role strain in daily care routines (Abreu et al., 2020; Cousins-Whitus et al., 2025). A second explanation is that frailty may add clinical instability through weakness, fatigue, mobility limitation, and vulnerability to minor stressors, thereby increasing caregiving complexity even when dementia severity is similar across patients (Cohen et al., 2024). The association with longer caregiving hours is also plausible because greater time investment may reflect higher care intensity and fewer opportunities for respite, task sharing, or recovery, patterns that have been noted in broader Asian dementia-care literature (Tran et al., 2025; Tay et al., 2022). In a tertiary hospital context such as Siriraj Hospital, these demands may be further amplified by multimorbidity, care transitions, and the expectation that family caregivers remain directly engaged in patient support during hospital-linked care processes (Anantapong et al., 2025). These are, however, plausible explanations only, and the cross-sectional design precludes causal inference.

Overall, these findings were broadly consistent with previous studies showing that greater functional dependency and frailty in people with dementia were associated with higher caregiver burden (Abreu et al., 2020; Cousins-Whitus et al., 2025). They were also partly aligned with Thai and regional studies reporting that caregiver burden was related to clinical complexity, symptom burden, or caregiving context rather than to cognitive severity alone (Pinyopornpanish et al., 2022; Tay et al., 2022). In contrast to prior studies, some investigations have found that activities of daily living were not directly associated with caregiver burden after accounting for behavioral and psychological symptoms of dementia or frailty, and other Thai work suggested that perceived stress and depressive symptoms were more proximal correlates of burden than patient neuropsychiatric symptoms themselves (Cohen et al., 2024; Pinyopornpanish et al., 2021). Several explanations are possible, including differences in dependency measures, care settings, dementia stage, covariate adjustment, sample size, and cultural expectations regarding family caregiving in hospital versus community contexts (Cohen et al., 2024; Tay et al., 2022; Tran et al., 2025). This study therefore adds context-specific evidence that care dependency, frailty, and caregiving intensity may coexist as important correlates of caregiver burden in a Thai tertiary-care dementia population.

The study had several strengths, including its dyadic design, the simultaneous assessment of patient dependency, frailty, and caregiver burden, and the use of standardized instruments within a clearly defined hospital-based dementia sample. However, the cross-sectional design precludes establishing temporality or causality between the observed variables. Additional limitations include the modest sample size, single-center recruitment, complete-case analysis, and reliance on partly questionnaire-based data, all of which may have introduced measurement error, residual confounding, or selection effects. Because caregiver psychological distress, detailed behavioral and psychological symptoms of dementia, and formal support availability were not fully modeled, some associations may have been overestimated or underestimated relative to studies that included these domains explicitly (Pinyopornpanish et al., 2021; Cohen et al., 2024; Tay et al., 2022). The findings are therefore most generalizable to tertiary-care Thai settings in which family members remain closely involved in dementia care and should be extrapolated cautiously to community or long-term care populations.

These findings suggest that routine dementia care in tertiary hospitals should include caregiver-burden screening alongside assessment of patient care dependency, frailty, and caregiving intensity. Hospitals, nurses, and geriatric teams should consider early identification of dyads with high dependency and frailty, followed by caregiver education, support planning, and referral pathways for sustained family caregiving needs, which is consistent with the broader regional call to address modifiable caregiving-context factors in dementia care (Tran et al., 2025). This study extends prior Thai work by providing integrated dyadic data from Siriraj Hospital rather than focusing on a single caregiver or patient domain alone (Anantapong et al., 2025). Future studies should use longitudinal and multicenter designs and should incorporate behavioral symptoms, caregiver stress, depressive symptoms, and formal support resources to clarify how these factors are jointly associated with caregiver burden over time (Pinyopornpanish et al., 2021; Pinyopornpanish et al., 2022; Cohen et al., 2024). Overall, in this tertiary-hospital sample of older adults with dementia, greater care dependency, higher frailty, and longer daily caregiving hours were associated with higher caregiver burden

Strengths And Limitations of The Study

This work should be read with several methodological considerations in mind. The cross-sectional design did not allow the temporal sequence between care dependency, frailty, caregiving intensity, and caregiver burden to be established, and no causal interpretation should be inferred. Although standardized instruments were used, part of the assessment relied on caregiver report and interviewer-administered responses, which may have introduced recall or reporting bias and some degree of measurement imprecision. The study was also conducted in a single tertiary hospital with a relatively small consecutive sample, which may have limited representativeness and introduced selection effects related to the hospital-based care context. In addition, residual confounding remains possible because factors such as caregiver psychological distress, behavioral and psychological symptoms of dementia, family support resources, and access to formal care were not fully incorporated into the adjusted model. Taken together, these considerations may have attenuated or inflated the observed associations and may limit transferability beyond comparable tertiary-care dementia settings; the findings should therefore be interpreted with appropriate caution

Implications For Nursing Practice

These findings underscore the value of viewing dementia care as a patient-caregiver dyad rather than a patient-only clinical encounter. In everyday nursing practice, closer attention to care dependency, frailty, and prolonged caregiving time may help identify families who are more likely to experience substantial caregiving strain and who may benefit from earlier support, closer follow-up, and more tailored care planning. At the service level, nursing leaders and hospital teams may consider integrating caregiver-burden screening into routine dementia assessment, alongside functional and frailty evaluation, particularly during care transitions and discharge preparation. A more structured approach of this kind may strengthen communication across multidisciplinary teams, improve continuity of care, and better align support strategies with the practical realities faced by families. While these findings do not establish causation, they may help inform more targeted and responsive nursing approaches in tertiary dementia care.

Conclusions

Caregiver burden in this tertiary-hospital dementia sample was closely linked to greater patient care dependency, higher frailty, and longer daily caregiving time. The findings highlight the importance of assessing patient vulnerability and caregiving demands together when planning dementia care in hospital-based settings. More integrated nursing assessment and caregiver-oriented support strategies may therefore be warranted, while longitudinal research is needed to clarify how these associations evolve over time.

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Conflict of Interest Statement
The authors declare that they have no competing interests.

Author contribution
Tanawa Sirichai conceived and designed the study, supervised data collection, and revised the manuscript critically. Khemkhaeng Decha contributed to data acquisition, data analysis, and manuscript drafting. Phassakorn Kovit contributed to the interpretation of findings, methodological refinement, and final approval of the submitted manuscript.

Data Availability
The data supporting the findings of this study are available from the corresponding author upon reasonable request

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