Project Title

"Weighing Down Hearts" – Examining Predictors to Caregiving Burden in Family Caregivers of Older Adults

Project Lead and Members

Project Lead: George Frederick Glass Jr

Project Members: Juliet Choo Lay Hiok, Chew Yin Hui Esther, Chan Ee Yuee

Organisation(s) Involved

Tan Tock Seng Hospital, Geriatric Education & Research Institute

Healthcare Family Group(s) Involved in this Project

Nursing, Healthcare Administration

Applicable Specialty or Discipline

Nursing Implementation Translation and Research, Geriatric

Project Period

Start date: NA

Completed date: NA

Aims

To identify predictors of caregiver burden in family caregivers of older adults.

Project Attachment

See poster appended/ below

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Additional Information

Singapore Health & Biomedical Congress (SHBC) 2023: Singapore Nursing Award – (Gold Award)

Project Category

Care Continuum

Preventive Care, Community Care

Applied/ Translational Research

Mixed-Methods

Keywords

Caregiving Burden, Geriatric Care

Name and Email of Project Contact Person(s)

Name: George Glass

Email: glass_george_frederick@ttsh.com.sg

SG-NR-03

"Weighing Down Hearts" – Examining Predictors to Caregiving Burden in Family Caregivers of Older Adults

George Frederick Glass Jr,[1] Juliet Choo Lay Hiok,[1] Chew Yin Hui Esther,[1] Chan Ee Yuee[1,2]
[1]Nursing Implementation Translation and Research Office, Tan Tock Seng Hospital, Singapore
[2]Geriatric Education & Research Institute, Singapore
Contact: Glass_George_Frederick@ttsh.com.sg

Tan Tock Seng Hospital
National Healthcare Group

BACKGROUND

By 2030, 1 in 4 Singaporeans will be aged 65 and above. This is further exacerbated by a declining old-age support ratio, which is expected to drop from the current value of 4.8 to 2.7 by 2030.[1] With 1 in 2 Singaporeans expected to face disability and long-term care needs in the future, many seniors will be reliant on a diminished pool of family members to meet their care needs.[1,2,3]

Without relief or support, the strain of care can manifest as a confluence of physical, psychological, emotional, social and financial problems experienced by the caregivers, defined as "caregiver burden".[4] Worryingly, our earlier research found that 1 in 3 caregivers of older patients in our hospital were at risk of depression, high anxiety and poor quality of life.[2] Such distress in caregivers could increase the risk of hospitalization or institutionalization of their loved ones.

Hence, it is imperative to pinpoint the predictors of caregiver burden in family caregivers, especially modifiable ones. This can guide the development of targeted interventions to better alleviate the challenges faced by family caregivers.

Aim: To identify predictors of caregiver burden in family caregivers of older adults.
Research Hypothesis: Both caregiver-specific and care recipient-specific variables would be associated with burden in the final model.

METHODS

This was part of a single site cohort study conducted at a tertiary hospital in Singapore. We targeted family caregivers aged 21 years and above providing care to patients aged 65 years and over, with no intention for institutionalization.

We identified potential caregiver-specific and care recipient-specific predictor variables through the literature. Data for these variables were captured through patients' electronic medical records and caregiver survey forms.

We initially conducted a univariate analysis of variables against burden, measured using the 12-item Zarit Burden Interview (ZBI-12). Variables with a p-value < 0.1 were retained. These were incorporated into a multivariable model. We applied backwards elimination to determine the best-fitting model. Standardized coefficients (β) were used to gauge the strength of each predictor's impact on ZBI-12.

RESULTS

Descriptive data

We recruited 68 patient-caregiver dyads.

Table 1: Summary of caregiver-specific and care recipient-specific variables (N = 68)

Variable	n (%)/ Mean±SD
Caregiver-specific variables	
12-item Zarit burden Interview (ZBI-12) score (0 – 48)	17.2 ± 9.2
Age (years)	60.7 ± 10.2
Gender	
Male	19 (27.9%)
Female	49 (72.1%)
Housing type	
HDB 1 – 2 room	4 (5.9)
HDB 3 – 4 room	39 (57.4)
HDC 5 room / Executive flat	16 (23.5)
Condominium / Landed property	9 (13.2)
Relationship to care-recipient	
Spouse	22 (32.4%)
Child	46 (67.6%)
Years Caregiving	7.5 ± 7.1
Living with care recipient	
Yes	65 (95.6%)
No	3 (4.4%)
Role in caregiving (Includes combined options)	
Organizing care	59 (86.8%)
Hands-on care	53 (77.9%)
Time spent caregiving per day (Hours)	7.5 ± 4.8
Help in caregiving (Includes combined options)	
Another family member	23 (33.8)
Paid helper	36 (52.9)
Daycare / Senior activity center	8 (11.8)
None	15 (22.1)
Time per week of help provided by helper/family/daycare center (Hours)	48.4 ± 44.4
Amount of sleep per night (Hours)	6.1 ± 1.6
Short-Form-12 (SF-12) Score	
Physical Component (SF12 PCS) (6 – 26)	20.6 ± 4.0
Mental Component (SF12 MCS) (6 – 30)	21.0 ± 5.4
Self-rated health (0 – 100)	75.6 ± 16.4
Care recipient-specific variables	
Modified Barthel Index (MBI) scores (0 – 105)	24.0 ± 22.2
Charlson Comorbidity Index (CCI) scores (0 – 32)	6.4 ± 2.2

Regression Modelling

A total of 8 variables were retained after univariate analysis and fit into the multivariable model.

Table 2: Comparison of multiple variable models predicting ZBI-12 with no missing values (N = 66)

Model	Variables in model	R^2	Adj. R^2	AIC	F-value
Full	Age, SF-12 MCS, Sleep, Help CG, MBI, CCI, Self rated health, SF-12 PCS	0.59	0.53	445.7	$10.24_{8,58}$
1	Age, SF-12 MCS, Sleep, Help CG, MBI, CCI, Self rated health	0.58	0.54	443.8	$11.88_{7,59}$
2	Age, SF12-MCS, Sleep, Help CG, MBI, CCI	0.58	0.54	442.9	$13.69_{6,60}$

Based on the Adjusted R^2, AIC and F-values, we identified Model 2 to be the best-fit, predicting ZBI-12 through caregiver age, their SF-12 Mental Component, whether they received help caregiving, hours of sleep and care-recipients' MBI scores and Charlson Comorbidity Index scores.

Table 3: Summary of adjusted effects of variables in final model (N = 68)

Variables	β	b (se)	95% Confidence Interval	T-value$_{DF}$	P-value
Caregiver age	-0.14	-0.12 (0.07)	(-0.28 - -0.03)	T_{60} = -1.59	0.12
Help in caregiving	-0.19	-4.14 (1.84)	(-7.83 - -0.43)	T_{60} = -2.24	0.03*
Hours of sleep	-0.23	-1.29 (0.51)	(-2.30 - -0.27)	T_{60} = -2.53	0.02*
SF-12 Mental Component	-0.48	-0.81 (0.15)	(-1.11 - -0.51)	T_{60} = -5.42	<0.001*
MBI Score	0.10	0.04 (0.04)	(-0.03 – 0.11)	T_{60} = 1.08	0.29
CCI Score	0.23	0.97 (0.38)	(0.20 – 1.73)	T_{60} = 2.54	0.02*

Our final model identified significant predictors to caregiver burden – (1) the presence of help in caregiving, (2) caregivers' hours of sleep, (3) the SF-12 mental component of caregivers and (4) the comorbidity scores of care-recipients. 58% of the variability in burden can be explained by these predictors.

Comparing the standardized coefficients, the SF-12 mental component was the most influential, with a β of 0.48. With each unit increase in SF-12 mental component, ZBI-12 scores decrease by 0.81 units.

Two predictors of particular interest are the presence of help in caregiving and the hours of sleep. An extra hour of sleep reduces ZBI-12 by 1.29 units. Similarly, providing help in caregiving, such as a migrant domestic worker, another family member or a senior activity center, decreases ZBI-12 by 4.14 units. Together, these actions can reduce caregiver burden and improve their capacity to continue providing care.

DISCUSSION

Caregiver-centric and care recipient-centric predictors to caregiving burden were found. 2 predictors are potentially modifiable:

Increasing caregivers' opportunity to sleep can contribute towards lowered burden scores

The availability of help in caregiving, regardless of provider, can contribute towards lower burden scores

Consistent with earlier research on caregivers in China, increasing the number of individuals supporting the care of a care recipient contributes to lower burden.[5] Nurse-led caregiver interventions could prioritize increasing access to help and night respite options to improve opportunities for sleep at home.

Implications for Further Research

One limitation was a lack of longitudinal data, preventing causality establishment. Future studies should assess interventions enhancing caregiver support and sleep optimization to determine impact on burden.

Implications for Nursing Practice

Interacting with caregivers daily, nurses are uniquely positioned to recognize those stressed and in need of help. With a better understanding of the factors contributing to caregiver burden, nurses can more effectively identify high-risk caregivers, such as those tending to loved ones with multiple comorbidities.

They can explore interventions that promote sleep and facilitate access to assistance, reducing caregiver burden accordingly.

ACKNOWLEDGEMENTS

We wish to extend our gratitude to the inpatient ward teams on Levels 5 and 7 at the hospital for their collaboration in the identification of suitable participants. We are grateful for the support and participation of our patients and caregivers in this study to share their insights and experiences as well.

REFERENCES

[1] National Council of Social Services. *Understanding the Quality of Life of Caregivers* (2022).
[2] Chan, E.Y., *et al.* Development of a Brief Caregiver-centric Screening Tool to Identify Risk of Depression among Caregivers of Hospitalized Older Adults. *J Nutr Health Aging* **23**, 578-585 (2019).
[3] Chan, E.Y., *et al.* Applying the RE-AIM framework to evaluate a holistic caregiver-centric hospital-to-home programme: a feasibility study on Carer Matters. *BMC Health Serv Res* **22**, 933 (2022).
[4] George, L. & Gwyther, L. Caregiver well-being: A multidimensional examination of caregivers of demented adults. *The Gerontologist* **26**, 253-259 (1986).
5 Li, J. Predictors of Family Caregiver Burden in Shanghai. *Journal of Applied Gerontology* 1-10 (2020)