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The Effect of DRIMS Nursing Intervention on Stress Levels And The Burden of Caregivers of Elderly People With Diabetes Mellitus In Abadijaya, Depok City

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ABSTRACT

Background: Caregivers of elderly people with diabetes mellitus experience a variety of physical and psychological health problems as a result of lack of support and the complexity of diabetes mellitus. These conditions result in increased stress and burden on caregivers in providing care. Objective: To determine the effect of nursing interventions Deep breathing, Progressive muscle relaxation, Guided imagery, Diabetes management and Support group (DRIMS) on stress levels and care burden of elderly caregivers of diabetes mellitus in Abadijaya, Depok City. Methods: This scientific work uses a case study method on thirty-nine elderly caregivers of diabetics. Results: Caregivers are dominated by women of mature age, have secondary education, earn less than the minimum wage of Depok City and are the children of the elderly diabetics they care for. The evaluation showed a significant difference in the mean level of stress and caregiver burden ($p < 0.001$) in the caregiver group after the intervention for 8 months. Conclusion: DRIMS intervention has an effect in reducing the stress and burden of elderly caregivers in caring for elderly diabetics. Suggestion: Integrating the DRIMS intervention is recommended in community nursing care standards.

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Introduction

Caregivers of elderly diabetics experience physical and emotional exhaustion in carrying out their roles. Caregivers often show signs of stress such as irritability, anger, sleep disturbances, and fatigue to the point of neglecting their own needs. Several studies have highlighted that caregivers of elderly people, especially those caring for patients with chronic diseases such as diabetes, experience high levels of stress and caregiving burden. Research shows that 67.27% of caregivers experience moderate stress, while 14.55% suffer from severe stress due to their role (Mubin et al., 2019). Research by Javanmardifard et al. (2022) reports that 46% of caregivers of diabetics experience a light caregiving burden, 46% a moderate burden, and 8% a heavy burden. Hale & Marshall (2022) argue that caregiver stress is characterized by fatigue, self-neglect, depression, anxiety, and sleep disorders (insomnia).

A caregiver is an individual who provides care to another person. In short, caregiving means supervising to monitor the well-being of clients (Kaakinen et al., 2018). Caregivers are responsible for providing physical, emotional, and financial support to family members who are unable to care for themselves due to illness or disability (Setyoadi et al., 2024). These tasks add to the caregiver's mental burden, making them prone to stress (Izzati et al. 2023). According to Tangiisuran et al (2022), informal caregivers have higher stress levels than formal caregivers.

Stress is a natural response to challenges or pressures faced. Everyone experiences stress to some degree. However, how we respond to stress makes a big difference to our physical and mental well-being and health (World Health Organization, 2023). Stress arises when individuals interact with their environment and feel that there is an imbalance between the demands they face and their resources or abilities to meet those demands (Amanullah & Shankar, 2020).

Based on Caregiver Stress Theory (CST), the process of stress occurrence in caregivers is the result of a complex interaction between objective burdens, social support, and individual factors, all of which influence how caregivers assess and respond to stress in their roles. Objective burdens in caregiving, such as the physical and emotional demands of caring for chronically ill individuals, serve as the main stimulus that triggers stress. These burdens include working hours, caregiving responsibilities, and necessary care arrangements. In addition, contextual factors such as stressful life events, social support, and social roles also play a role in influencing the perception of stress. Residual factors such as race, age, gender, and relationship with the care recipient also influence how caregivers feel and respond to stress (Tsai, 2003).

Stress in caregivers can cause various negative effects such as a decline in physical health, an increase in mental problems, and a decline in overall quality of life (Broxson & Feliciano, 2020). The results of a study by Rachmawati et al (2022) indicate that the stress felt by caregivers has a negative effect on their cognitive and psychomotor abilities in providing care.

Various studies related to stress in caregivers are increasingly developing. Some studies focus on the causes of stress, while others evaluate intervention strategies that can reduce stress through relaxation techniques. Research results show that the 4-7-8 relaxation technique, performed 3-7 times until feeling calm, can reduce stress levels and reduce the physical effects of stress, such as reducing headaches, tension, and low blood pressure (DeStefano, 2023).

Another relaxation technique often used to reduce stress is progressive muscle relaxation. Research by Çapacı et al. (2022) reports that progressive muscle relaxation interventions can reduce stress levels, depression, and the burden of care felt by caregivers in caring for the elderly. In addition, guided imagery techniques have been shown to reduce stress levels. Research findings indicate that guided imagery techniques have been proven to enhance positive emotions and reduce stress (Zemla et al., 2023).

Group support intervention is one of the interventions provided as an effort to reduce the stress felt by caregivers, in addition to relaxation techniques. Based on caregiver stress theory, social support functions as a moderating factor that can reduce the perception of stress experienced by caregivers. Social support can influence how caregivers assess their situation. The availability of social support allows caregivers to view the burdens they face as challenges that can be overcome, rather than threats (Tsai, 2003). The results of research by Aulia & Putrikitita (2024) indicate that group support interventions can reduce the level of stress experienced by caregivers.

Various studies have tested interventions to reduce stress in caregivers of elderly people with diabetes, through deep breathing relaxation techniques, guided imagery, progressive muscle relaxation, and support groups. However, these interventions were conducted individually. Stress in caregivers is multidimensional, where the sources of stress are not only physical but also psychological and social (Broxson & Feliciano, 2020). Relaxation techniques only address the physiological aspects of stress, while caregivers also need emotional support and skills in managing elderly diabetics. Therefore, additional interventions are needed, such as diabetes management education (Pham et al. 2020).

Diabetes management education is a series of interventions aimed at facilitating increased knowledge and skills, or caregiver behavior, in caring for elderly people with diabetes. Diabetes management includes education on diabetes mellitus, diet, blood sugar management, physical activity, and foot care (Felix et al., 2020). Based on this, nursing interventions that can be provided to reduce the level of stress burden on elderly diabetic caregivers include deep breathing (4-7-8), progressive muscle relaxation, guided imagery, diabetes management education, and support groups (DRIMS). The combination of these interventions constitutes a comprehensive approach to address the physical, psychological, emotional, social, and cognitive dimensions of stress and the caregiver's needs.

Methods

Study Design

This study used a case study approach with a pretest–posttest design to examine the effect of the DRIMS intervention on stress levels and caregiving burden among caregivers of older adults with diabetes mellitus.

Participants and Setting

Participants were 39 caregivers of older adults with diabetes mellitus, selected using purposive sampling. Inclusion criteria included being the primary caregiver, aged ≥ 18 years, able to communicate effectively, and willing to participate. The study was conducted in Depok City, Indonesia.

Instruments

Caregiver stress and burden were measured using the Perceived Stress Scale (PSS) and Zarit Burden Interview (ZBI). Both instruments were administered before (pretest) and after (posttest) the intervention.

Data Collection Procedure

After completing the pretest, participants received the DRIMS intervention consisting of 12 sessions, each lasting 60 minutes. The intervention included stress management education, relaxation techniques, support group activities, diabetes management education, use of the DRIMS Android application, and physical activity training. Posttest measurements were conducted after all sessions were completed.

Data Analysis

Changes in stress and burden scores between pretest and posttest were analyzed using a Wilcoxon signed-rank test, with $p < 0.05$ considered statistically significant.

Ethical Consideration

Informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

RESULTS

Caregivers of elderly diabetics are predominantly female, middle-aged, of Javanese ethnicity, with a secondary education, earning less than the minimum wage in Depok, and are children of the elderly diabetics they care for. The characteristics of caregivers are described in more detail in Table 1.

Table 1. Caregiver Characteristics (n=39)

Characteristic	Category	Frequency (n)	Percentage (%)
Age	Adult	18	46
	Pre-elderly	13	33
	Elderly	8	21
Gender	Male	11	28
	Female	28	72
Ethnicity	Javanese	23	59
	Betawi	11	28
	Sunda	5	13
Education	Basic (Elementary, Junior High School)	10	26
	High School	23	59
	University	6	15
Relationship with Elderly Diabetics	Spouse	9	23
	Children	19	49
	Son-in-law/Daughter-in-law	4	10
	Siblings	4	10

The results of the analysis of the difference between two means for normally distributed data, paired t-tests on stress levels and caregiver burden scores among elderly diabetics before and after the DRIMS intervention, are described in Table 2.

Table 2. Mean stress and burden of caregivers of elderly diabetics before and after the DRIMS intervention in Abadijaya Village, Depok City, May 2025 (n=39)

Variable	Mean (Pre)	Mean (Post)	Mean Difference	SD (Pre)	SD (Post)	p-value
Stress	16.59	11.20	5.39	5.02	4.33	<0.001
Caregiver Burden	28.10	20.33	7.77	9.83	9.62	<0.001

The results show that there is a significant difference in the average stress level and burden of caregivers of elderly diabetics before and after the intervention. This means that the DRIMS intervention is effective in reducing the stress and burden felt by caregivers in caring for elderly people with diabetes mellitus.

DISCUSSION

Caregivers for elderly people with diabetes are predominantly female (80%), adults (aged 19-45 years), of Javanese ethnicity, with a secondary education (high school or equivalent), earning more than the minimum wage in Depok City, and are children of the elderly people they care for (60%). The results of this study are in line with several previous studies, which found that caregivers for the elderly are on average adults (Alsaedi et al., 2022). The predominance of adults among caregivers is based on the characteristics of the population of Abadi Jaya sub-district, which is also dominated by adults (BPS, 2024).

Adulthood is marked by a shift in an individual's focus from personal interests to family priorities. At this stage, a person has generally reached maturity in thinking, demonstrates wisdom, is able to manage emotions well, and has a high level of tolerance towards others. Therefore, the majority of family members who take on the role of caregivers come from the adult age group (Ariska et al., 2020).

Most caregivers are female children of the elderly diabetics they care for. This phenomenon reflects a common pattern in Indonesian families, where the role of caring for parents is more often assigned to women and biological children, especially in Javanese, Betawi, and Sundanese cultures, which dominate foster families in the Abadijaya subdistrict of Depok City. This finding is in line with research conducted by Kristinaningrum et al. (2021), which shows that almost half of caregivers of elderly diabetics are biological children of elderly diabetics.

Most caregivers have a secondary education and earn more than the minimum wage in Depok City. This finding contradicts the research by Fitriani et al. (2024), which revealed that most caregivers have a basic education and earn less than the minimum wage. This is due to differences in residential characteristics, as the research was conducted in Bogor Regency, while the current intervention is being implemented in Depok City. Urban residents participate more in schooling than rural residents.

The results of the analysis show that the DRIMS intervention had a significant effect in reducing stress levels and the burden on caregivers of elderly diabetics.

This shows that stress management training through deep breathing techniques, progressive muscle relaxation, and guided imagery in the DRIMS innovation helps caregivers respond to stressors in a calmer and more controlled manner (Tsai, 2006).

Based on Caregiver Stress Theory (CST), stress in caregivers is the result of interactions between various input factors (such as objective burden, social support, social role, and relationship with the care recipient), control processes (such as perception of stress and depression levels), and output or impact (such as physical function, self-esteem, role satisfaction, and relationship satisfaction) Input components such as stressful life events and low social support, which are commonly experienced by caregivers, are addressed through the formation of support groups and training in practical skills for caring for elderly diabetics. Meanwhile, control aspects such as perceived stress are targeted through deep breathing relaxation exercises, progressive muscle relaxation, and guided imagery, which have been proven to reduce caregivers' physiological and psychological stress responses. Output components, such as improved physical function and emotional well-being, can be seen from the reduction in stress levels and caregiving burden among caregivers. Therefore, the application of DRIMS is not only an education-based intervention but also an adaptive approach that addresses various dimensions of stress among caregivers.

This achievement is closely related to the intervention approach used, namely the integration of education and stress management exercises (4-7-8 breathing relaxation, guided imagery, and progressive muscle training) as well as the formation of support groups. Research findings indicate that the 4-7-8 relaxation technique, performed 3-7 times until calmness is achieved, can reduce stress levels and mitigate the physical effects of stress, such as headaches, tension, and low blood pressure (DeStefano, 2023).

Another relaxation technique provided was guided imagery. The results of a study by Toussaint et al. (2021) also reported higher relaxation levels in the group that received guided imagery intervention compared to the control group. In addition, guided imagery techniques are also effective in reducing electrodermal activity, which reflects physiological relaxation.

The third relaxation technique provided as an effort to reduce stress levels and the burden on the elderly DM Caregiver group is progressive muscle relaxation (PMR). Research by Toussaint et al. (2021) shows that respondents who received PMR intervention experienced a significant increase in relaxation levels after the session compared to the control group. Additionally, there was a significant difference in the average care burden when comparing the control group with the group that received PMR intervention (Sepahvand et al., 2022).

Support group intervention is one of the interventions provided as an effort to reduce the stress felt by caregivers. The results of a study by Aulia & Putrikita (2024) indicate that group support intervention can reduce the stress levels felt by caregivers. The research by Miller et al. (2020) revealed that social support not only reduces the stress levels of caregivers but also improves stress management. The availability of social support allows caregivers to see the burden they face as a challenge that can be overcome, not as a threat (Tsai, 2006).

IMPLICATIONS FOR NURSING PRACTICE AND INNOVATION

DRIMS is an integrated nursing innovation that combines stress management, diabetes education, support group intervention, and digital health support. This intervention can be implemented by nurses as a structured caregiver empowerment model within community and primary health care services. DRIMS is low-cost, easy to apply, and adaptable to resource-limited settings, supporting holistic caregiver care, improving stress management, and enhancing the sustainability of elderly diabetes management.

CONCLUSION

This study found that the DRIMS intervention significantly reduced stress levels and caregiving burden among caregivers of elderly people with diabetes. By combining stress management techniques, structured diabetes education, support group formation, and digital health support, DRIMS addresses caregiver stress holistically based on the Caregiver Stress Theory framework. The key message of this study is that caregiver-centered, nurse-led interventions are essential for improving the sustainability of elderly diabetes care. DRIMS represents a practical and innovative nursing approach that can be effectively implemented in community and resource-limited settings.

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AUTHOR CONTRIBUTIONS

FF: Conceptualization, Methodology, Investigation, Intervention Development, Data Collection, Formal Analysis, Writing Original Draft. JS: Supervision, Methodological Guidance, Writing Review & Editing. ER: Supervision, Validation, Scientific Guidance, Writing Review & Editing. All authors have read and approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

INFORMED CONSENT

Written informed consent was obtained from all participants prior to data collection.

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