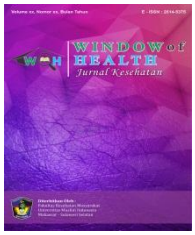
Window of Health : **Jurnal Kesehatan, Vol. 8 No. 4 (October, 2025) : 478-490** **E-ISSN 2614-5375**

Window of Health Jurnal Kesehatan
journal homepage : www.jurnal.fkmumi.ac.id



ARTICLE RESEARCH
URL artikel: http://jurnal.fkmumi.ac.id/index.php/woh/article/view/woh8021

Diabetes Burnout Among the Elderly With Type 2 Diabetes

Ummu Muntamah [1], Dewi Siyamti [2], Medina Sianturi [3]
[1,2]Departement of Nursing, Faculty of Health, University of Ngudi Waluyo, Semarang, Indonesia
[3] Departement of Nursing, St. Elisabeth School of Health Science, Semarang, Indonesia
Email Corresponding Author(C): ummu.muntamah@gmail.com
ummu.muntamah@gmail.com[1], wwdewiq123@gmail.com [2], challenia@gmail.com[3]

ABSTRACT

Diabetes mellitus (DM) is one of the most prevalent chronic diseases among the elderly, often leading to complications, dependency, and psychosocial burdens. Globally, over 20% of adults aged ≥65 years live with DM, and in Indonesia, its prevalence among the elderly reaches 19.2%. Despite this high burden, limited studies have addressed diabetes burnout (DB) in elderly patients, particularly within cultural contexts where family caregivers play a central role. This study aimed to explore the level of burnout in the elderly with DM and identify contributing factors. A descriptive-analytical quantitative design was applied involving 176 elderly DM patients registered in the Prolanis program at Semarang Regency Health Center, selected using purposive sampling. Data were collected using the Diabetes Burnout Syndrome (DBS) questionnaire and analyzed with descriptive statistics, chi-square test, and logistic regression. Findings showed that most participants were female, had a high school education, and had lived with DM for less than five years. Gender and education had a significant influence on DBS scores ($p < 0.005$). Burnout was higher among women, patients with DM >5 years, and those with a bachelor's degree. Education emerged as the most influential factor, with higher education levels associated with an 11.76-fold increased risk of burnout ($p < 0.001$). Conclusion: Education plays a dominant role in shaping burnout among the elderly with DM. Interventions tailored to demographic characteristics, disease duration, and employment status, supported by social support and health education, are crucial for reducing burnout and enhancing chronic care.

Keywords : Diabetes burnout; the elderly; type 2 diabetes mellitus

PUBLISHED BY :
Faculty of Public Health
Universitas Muslim Indonesia
Address :
Jl. Urip Sumohardjo Km. 5 (Campus II UMI)
Makassar, Sulawesi Selatan.
Email :
jurnalwoh.fkm@umi.ac.id
Phone :
+62 82188474722

Article history
Received 7 May 2025
Received in revised form 11 September 2025
Accepted 20 October 2025
Available online 22 October 2025

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is defined by the World Health Organization (WHO) and the American Diabetes Association (ADA) as a chronic, progressive metabolic disorder characterized by hyperglycemia resulting from a combination of insulin resistance and impaired insulin secretion.[1,2] Globally, T2DM has become a major public health challenge. According to the 2023 IDF Diabetes Atlas, more than 537 million adults are currently living with diabetes, and this number is projected to rise to 783 million by 2045.[3] A substantial proportion of these cases occur among the elderly (≥60 years), who are particularly vulnerable to complications, functional decline, and psychological burdens associated with long-term disease management

At the national level, the 2023 Basic Health Survey (Riskesdas) reported that the prevalence of diabetes among older adults in Indonesia reached 6.5%.[3] This reflects a considerable burden of chronic disease in the elderly population, which is often accompanied by microvascular and macrovascular complications, physical functional decline, and increased dependency on family members or caregivers.[4] Beyond physical health, the continuous demands of self-care can expose older adults to chronic psychological stress, which in turn may develop into diabetes burnout—an emerging issue that has received growing attention in the literature but remains underexplored in the Indonesian context.

At the local level, data from the Semarang District Health Office (2023) indicated that more than 7,000 older adults were enrolled in the PROLANIS (Chronic Disease Management Program).[5] The majority of participants were diagnosed with hypertension and diabetes, and 371 were identified as older adults with type 2 DM (T2DM).[6] Despite these figures, there is currently no systematic assessment of psychological conditions such as diabetes burnout among PROLANIS participants.[7] This gap may be explained by the fact that national and district-level surveillance systems have so far prioritized biomedical indicators (e.g., blood glucose control, complications, and comorbidities), while psychosocial aspects have not yet been integrated into routine monitoring. Recent studies emphasize that neglecting psychosocial dimensions including diabetes distress and burnout—limits the effectiveness of chronic disease programs, as these factors strongly influence adherence, quality of life, and long-term outcomes.[3–5] Consequently, the absence of burnout data hinders a comprehensive evaluation of program effectiveness and obscures potential barriers to long-term adherence and quality of care.

Diabetes burnout is a psychological response characterized by emotional, physical, and mental exhaustion caused by the unrelenting demands of self-management.[10] Individuals experiencing burnout often demonstrate reduced motivation in managing their condition, lower adherence to therapy,[11] and significant elevations in blood glucose levels.[12 13] This condition can worsen prognosis and increase the elderly's dependence on caregivers and health services.[8] International studies have found that the prevalence of diabetes burnout ranges from 15% to 28%, with substantial consequences for quality of life, increased risk of complications, and even premature death.

In the Southeast Asian context, psychosocial challenges in diabetes management have begun to gain attention, although systematic studies on diabetes burnout remain limited. A multicenter study in Malaysia and Singapore highlighted that patients with type 2 DM often experience high levels of diabetes distress and depressive symptoms, which closely correlate with poorer glycemic control and reduced treatment adherence. [6,7] In Indonesia, recent reports also underscore the significant psychosocial burden among individuals with diabetes, particularly in older adults, yet burnout has not been routinely assessed in clinical or community settings.[7,8] This gap highlights the urgent need to explore diabetes burnout in the Indonesian elderly population to provide empirical foundations for contextually relevant interventions.

The rising number of diabetes cases and their psychological impacts among older adults have gained increasing attention over the past decade, particularly as life expectancy improves and lifestyle patterns shift. Although several studies have examined diabetes burnout, the majority have focused on younger adults or working-age populations in developed countries, where healthcare resources and cultural dynamics differ substantially from those in low- and middle-income nations.[9] Research specifically targeting older adults with T2DM in developing countries such as Indonesia remains limited, creating a significant knowledge gap.

This study offers novelty by addressing diabetes burnout among the elderly within a developing country context, where family-centered caregiving, limited access to geriatric mental health services, and cultural norms emphasizing interdependence may shape the experience of burnout differently compared to high-income settings.[10] Furthermore, prev

ious research in Southeast Asia has predominantly investigated diabetes distress or depression rather than burnout as a distinct psychosocial construct. By focusing on elderly Indonesians with T2DM, this study provides new empirical insights that are both contextually relevant and culturally grounded.

Factors suspected to contribute to diabetes burnout include individual characteristics such as age, gender, and education level, alongside social support, economic status, healthcare access, and perceived stress. Evidence shows that older age is associated with higher treatment fatigue and reduced adaptive capacity.[11] Gender differences also emerge, with women often reporting greater psychological distress related to diabetes self-management.[5] Educational attainment plays a dual role: while higher education can improve knowledge and self-care, it may also heighten expectations and pressure, thereby exacerbating feelings of burnout when glycemic targets are not achieved.[12] Limited economic resources and restricted access to healthcare further compound these risks, especially in rural or resource-constrained areas such as many districts in Indonesia.

Previous findings have highlighted the importance of approaches that incorporate social support, self-efficacy, and spirituality in assisting patients to cope with burnout. However, no specific model has been developed for the elderly that accounts for cultural diversity, local health systems, and the central role of family caregivers.[13] In the Indonesian context, culture plays a critical role in shaping health behaviors and caregiving practices. For example, the strong value of *gotong royong* (collective support)

and the normative expectation that family members—especially adult children—should provide care for their elderly parents, create a unique caregiving environment that differs from Western models of chronic care. Moreover, cultural norms influence diet patterns, attitudes toward modern versus traditional medicine, and the extent to which elderly patients engage in self-management.

Therefore, this study is both timely and relevant, as it provides empirical foundations for developing evidence-based, culturally appropriate psychosocial and nursing interventions. By explicitly integrating cultural dimensions—such as filial responsibility, intergenerational caregiving, spiritual practices, and dietary habits—into chronic care programs, this research aims to contribute to more humanistic and sustainable approaches for elderly individuals with diabetes in Indonesia. Given the limited evidence on diabetes burnout among older adults in Indonesia and the unique cultural, social, and economic contexts that shape disease management in this population, it is crucial to conduct research that specifically addresses these gaps. Understanding how individual characteristics such as gender, education, and duration of illness interact with social support and access to healthcare can provide valuable insights into the determinants of burnout. This study therefore aims to examine the prevalence and associated factors of diabetes burnout among elderly individuals with T2DM in Semarang Regency. The findings are expected to generate empirical evidence that not only advances scientific knowledge but also serves as a foundation for developing culturally appropriate, evidence-based interventions to support more sustainable and humanistic chronic care for the elderly in Indonesia.

METHOD

The study was conducted in November-December 2024 using a descriptive analytical design with a quantitative approach. This design was chosen to measure the level of burnout in the elderly with DM. It also helped in the analysis of the relationship between the influencing factors and the level of burnout. The population included 314 elderly who suffered DM as Prolanis participants and were registered in the Prolanis program at the Semarang Regency Health Center [14,15]. Using the Slovin formula, the number of samples was 176 participants. Sampling was conducted using a purposive method following certain inclusion criteria. These include the elderly aged ≥ 60 years who were diagnosed with DM for more than 1 year, able to communicate well, and willing to participate in the study by signing an informed consent. Data were collected using the Diabetes Burnout Syndrome (DBS) questionnaire, which had been tested for validity and reliability.[16] The information was analyzed by descriptive statistics to describe the characteristics of respondents and the level of burnout. Inferential analysis was conducted using the chi-square test and logistic regression to identify the contributing factors. This study received ethical clearance by the Ethics Committee of the Faculty of Health, University of Ngudi Waluyo, with the certificate number 60/KEP/EC/UNW/2024.

RESULTS

The characteristics of the participants were mostly female, with a high school education and working. The majority had been diagnosed with DM for less than 5 years, as detailed in Table 1.

Table 1. Characteristics of Participants

Variables	n (179)	%
Gender		
- Male	66	36,9
- Female	113	63,1
Age		
- 60 – ≤ 70 years	168	95,4
- > 70 years	8	4,54
Education		
- Senior High School	144	80,4
- Higher Education	35	19,6
Job		
- Doesn't Work	70	39,1
- Work	109	60,9
Duration of DM		
- ≤ 5 years	159	88,8
- > 5 years	20	11,2
Glucose Level		
- Minimum	162	
- Maximum	314	
- Mean ±SD	232,86 ± 38,53	

DBS was significantly influenced by gender and education (p<0.005). Its scores were higher in respondents who had DM for more than 5 years, were female, had an undergraduate education, and were employed, as shown in Table 2.

Table 2. Analysis of Characteristic Factors Against DBS Scores

Variables	Burnout, mean ± sd	p
Gender		
- Male	35,82 ± 15,03	0,076[a]
- Female	45,60 ± 16,57	
Education		
- Senior High School	39,68 ± 16,09	< 0,001[a]
- School	51,51 ± 15,75	
Job		
- Doesn't Work	41,99 ± 15,49	< 0,001[a]
- Work	42 ± 17,44	
Duration of DM		
- ≤ 5 years	41,19 ± 16,60	0,076 [a]
- > 5 years	48,35 ± 16,19	
Age	62,34 ± 4,58	0,173[b]
DBS Score	41,99 ± 16,66	

In Table 3, the result of the study using the dominance test showed that education mostly influenced DBS score 11.74 times compared to other characteristics (p<0.001).

Table 3. Test of Dominant Characteristic Factors Affecting DBS Score

Variables	B	p	CI 95%
(Constant)	-12.211	,474	-45,822 – 21,399
Gender	9,198	,000	4,486 – 13,909
Age	,329	,208	-,185 - ,843
Education	11,744	,000	5,863 – 17,625
Duration of DM	4,172	,266	-3,201 – 11,546

Table 3 shows the dominant characteristic factors affecting Diabetes Burnout Syndrome (DBS) scores. The analysis indicates that education and gender are significant predictors. Specifically, individuals with higher education levels had DBS scores 11.74 points higher compared to those with lower education (B = 11.744; 95% CI: 5.863–17.625; p < 0.001). Likewise, gender was significantly associated with DBS scores, with males having an average increase of 9.19 points compared to females (B = 9.198; 95% CI: 4.486–13.909; p < 0.001).

In contrast, age and duration of diabetes did not significantly affect DBS scores (p > 0.05). This suggests that educational attainment and gender are the dominant factors influencing the level of diabetes burnout among the study population.

DISCUSSION

The results showed that burnout in the elderly with DM has a significant relationship with individual characteristics, specifically gender and education level. This strengthens existing literature suggesting that demographic factors had an important role in influencing burnout in the elderly with DM.

The Relationship between Gender and Burnout

This study showed that there are gender differences in DBS scores. Men and women have different perceptions and feelings in dealing with burnout, with the present study showing higher scores among elderly women. This suggests that elderly women may be more susceptible to emotional, physical, and mental exhaustion than men. Similarly, previous studies have demonstrated that women tend to have more intense emotional responses to stress, including in dealing with chronic disease.[17] Cortisol responses to stress among older women are higher, leading to poorer stress regulation and an increased risk of burnout.[18] Furthermore, the double burden of social and family roles can exacerbate burnout risk in elderly women. [19,20]

In the Indonesian cultural context, women particularly elderly women often retain strong responsibilities within the household even in later life.[17] Many older women continue to play central roles as caregivers for grandchildren or family members, while simultaneously managing their own

chronic illness. This “double burden” is not only physical but also emotional, as women are socially expected to embody patience, resilience, and dedication to family welfare. Such cultural expectations can increase pressure, reduce time for self-care, and heighten feelings of exhaustion. Moreover, societal norms that view women as the primary family caretakers may make them less likely to express psychological distress openly, thereby compounding the risk of silent burnout. These cultural dynamics, rooted in Indonesia’s collectivist values and gendered division of labor, contribute significantly to the observed higher burnout levels among elderly women with diabetes.

This is in line with the present study, where gender presented a 9.198 effect. Previous research also indicates that men often underestimate problems related to diabetes, while women tend to be more proactive in disease management, actively seeking information and adapting treatment behaviors.[21] However, this proactive stance can paradoxically contribute to burnout when expectations are not met or when glycemic control remains poor. In contrast, men may only respond when conditions worsen, thus experiencing burnout differently. Although many studies have explored gender differences, few have directly connected them with diabetes symptoms or the influence of cultural roles. The findings from this study suggest that gender and cultural norms together shape the psychosocial experiences of elderly individuals with T2DM in Semarang Regency.

Pathophysiological mechanisms may further explain this disparity. Chronic diseases in elderly women may trigger stronger inflammatory responses, increasing the risk of fatigue and burnout.[22] Systemic inflammation, sarcopenia, and atherosclerosis are considered key contributors. [23] In relation to diabetes, women have twice the risk of experiencing comorbidities compared to men,[24] and higher fat mass with elevated inflammatory cytokine levels have also been reported in elderly women, which may contribute to greater vulnerability to burnout.[25] These biomedical mechanisms, when combined with cultural expectations and gendered roles, highlight the multifactorial nature of diabetes burnout in elderly women in Indonesia.

The novelty of this study lies in its integration of gender analysis with the influence of local cultural norms in Indonesia, particularly those shaping the roles and expectations of elderly women. While previous research has mostly examined biological and psychological aspects of diabetes burnout, few have contextualized these findings within the socio-cultural environment of developing countries. By highlighting how cultural expectations of women as family caretakers and their double social burden intersect with disease management, this study provides a more comprehensive and culturally relevant understanding of diabetes burnout. These insights are essential for designing interventions that are not only evidence-based but also sensitive to gendered and cultural realities in Indonesia, thereby contributing to more humanistic and sustainable chronic care strategies for elderly populations.

The Relationship between Education and Burnout

This study found that education significantly influences DBS scores, with elderly individuals who had a higher educational level showing up to 11.74 times greater risk of experiencing burnout. One possible explanation is that those with advanced education may have higher expectations regarding

disease management outcomes. Increased awareness of the complications and long-term consequences of DM may heighten psychological pressure, and when desired outcomes are not achieved, feelings of frustration and emotional distress may occur.

The relationship between education level and diabetes burnout has been inconsistently reported in previous studies. Some findings suggest that individuals with higher education tend to possess better knowledge and skills in diabetes self-management, which could reduce the risk of burnout by promoting effective coping strategies. In contrast, other studies indicate that greater disease-related knowledge may amplify stress and anxiety, especially when glycemic control remains difficult to achieve despite adherence to treatment.[26] A recent study in 2022 reported that diabetes burnout affects 20–40% of patients with both type 1 and type 2 DM, highlighting its role as a major psychosocial challenge that impairs quality of life, self-care behaviors, and glycemic control.[27]

In addition, other evidence has suggested that a higher educational background may also be associated with greater emotional intelligence, which theoretically could help patients manage stress more effectively.[28] However, when emotional intelligence is not adequately supported by social or health system resources, the psychological burden may still accumulate. This finding emphasizes the importance of integrating not only diabetes education but also psychological support—such as stress management and resilience training—into chronic care programs for the elderly.

Despite these insights, the literature specifically examining how education level influences burnout among elderly individuals with T2DM remains limited, particularly in low- and middle-income countries. Further research is required to clarify whether higher education serves as a protective factor or, conversely, as a risk factor due to heightened expectations. Addressing this gap is crucial for designing tailored interventions that consider educational background when promoting sustainable diabetes self-care and preventing burnout in elderly populations.

In the Indonesian cultural context, individuals with higher educational attainment often have broader access to health information, medical advice, and digital resources, which can shape their expectations of disease management. While this knowledge may enhance self-care practices, it can also generate pressure when outcomes do not align with expectations, especially in environments where health system resources are limited. Moreover, in many communities, educated elderly are perceived as role models within their families, which may further increase their sense of responsibility to manage their illness successfully. These cultural dynamics may help explain why higher education, rather than serving solely as a protective factor, can also contribute to greater vulnerability to diabetes burnout among elderly Indonesians with T2DM.

Duration of DM and Burnout Level

Elderly people who have suffered from DM for more than five years show higher DBS scores. A long duration of illness is frequently accompanied by chronic complications, reduced treatment adherence, and increased dependence on others, all of which can trigger burnout. The results of this study are consistent with previous reports indicating that longer duration of diabetes is correlated with

increased burnout and depressive symptoms in elderly patients. In fact, depressive symptoms and burnout have been shown to be three times more common in elderly diabetic patients with poor glycemic control.[10] Beyond the physical complications, several psychological mechanisms also explain the association between longer disease duration and higher burnout. Prolonged exposure to continuous self-management demands, such as strict dietary rules, regular medication, and glucose monitoring, may create feelings of monotony and helplessness over time. This sense of "treatment fatigue" can erode motivation and self-efficacy, resulting in emotional exhaustion and disengagement. In addition, elderly patients may develop a perception of "illness identity," where diabetes becomes a central part of their daily life and self-concept, leading to feelings of loss of autonomy and hopelessness. Persistent stress can also activate maladaptive coping strategies, such as avoidance or neglect of treatment, which further exacerbate burnout.

While cumulative physical complications, reduced treatment adherence, and greater dependency help explain this association, psychological mechanisms also play a central role. Prolonged exposure to the daily demands of diabetes self-management (medication schedules, dietary restrictions, frequent monitoring) often produces treatment fatigue a gradual wearing down of motivation and self-regulatory capacity that manifests as emotional exhaustion and disengagement from self-care behaviors.[29] Over time, repeated failures to reach glycemic targets despite sustained effort may lead to feelings of helplessness, loss of control, and lowered self-efficacy, which further drive burnout and reduce adherence.[9]

Cognitively, persistent self-management demands can deplete executive resources needed for planning and problem-solving, producing self-regulatory fatigue that undermines behavior change and leads to avoidance coping (e.g., skipping glucose checks or medications). Empirical studies have demonstrated that fatigue mediates the relationship between psychological stressors and poorer diabetes self-management, thereby linking prolonged disease duration to deteriorating functional status.[30]

Furthermore, increased burnout in elderly patients with type 2 DM can negatively affect functional status.[31] This condition often manifests as prolonged emotional, physical, and mental exhaustion,[9] leading to neglect of self-care for a certain period. [9,32] The chronic psychological burden may also be compounded by reduced social engagement, stigma, or diminished family support, which are common experiences among older adults. Therefore, both physiological complications and psychological mechanisms play a critical role in explaining the relationship between disease duration and burnout. Identifying and addressing these contributing factors is essential to prevent further negative impacts and to design interventions that support long-term resilience among elderly patients with T2DM.

Previous studies also confirmed that longer disease duration significantly increases patients' emotional burden and self-management fatigue, which are key predictors of diabetes distress and burnout. [11,31] A meta-analysis by Dennick et al. (2021) emphasized that chronic exposure to diabetes management demands over time is strongly associated with depressive symptoms and poorer quality of life, particularly among elderly patients.[32] Similarly, a study in Asian populations demonstrated that

elderly individuals with more than five years of diabetes were at higher risk of non-adherence and psychological fatigue, underscoring the cultural and systemic dimensions of long-term diabetes care. [33,34] Taken together, these findings highlight that disease duration is a crucial determinant of burnout in elderly diabetes patients, necessitating comprehensive interventions that not only address medical management but also provide psychosocial support to mitigate the risk of emotional exhaustion and functional decline.

Implications of Work on Burnout

The elderly who are still working show higher DBS scores. This suggests the possibility of facing additional challenges in balancing work demands with self-care needs. Physical limitations due to DM can also be a barrier to work performance, thereby increasing stress. In addition, the dual responsibility of maintaining productivity at work while simultaneously managing complex diabetes regimens may lead to emotional exhaustion, frustration, and feelings of inadequacy. For elderly individuals, these challenges are compounded by age-related declines in physical capacity, which may intensify the perception of being overburdened.

Previous studies have shown that employment status is closely linked to diabetes-related stress and burnout. A study reported that individuals with chronic diseases who continue to work experience higher levels of psychological stress, partly due to the mismatch between occupational demands and health limitations.[33] Similarly, Hajos et al. highlighted that diabetes patients in the workforce often struggle with adherence to medication schedules, dietary restrictions, and glucose monitoring during working hours, which contributes to elevated distress and burnout symptoms. [34]

Moreover, psychosocial stressors in the workplace, such as job insecurity, physical strain, and lack of employer support, have been identified as exacerbating factors for burnout in patients with type 2 diabetes.[35] For elderly workers, limited flexibility and inadequate workplace accommodations can further hinder effective disease management, leading to a cycle of poor glycemic control and worsening emotional burden. A systematic review by Fisher et al. also emphasized that working patients with diabetes experience a higher prevalence of diabetes distress compared to their retired counterparts, suggesting that occupational demands amplify the psychological load of chronic disease management. [36]

Taken together, these findings underscore that employment in elderly diabetic patients can be a double-edged sword. While work may provide financial stability and social engagement, it also poses significant risks for increased diabetes burnout if not accompanied by adequate support systems. Interventions tailored to this group should therefore include workplace education on chronic disease, flexible working arrangements, and psychosocial support to mitigate the adverse impact of work-related stress on diabetes self-care and emotional well-being.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study affirmed the importance of considering demographic factors, disease duration, and employment status in developing interventions to reduce burnout among the elderly with

DM. Interventions should focus on women, the elderly with higher education, and long-term DM. Furthermore, social support and health education programs helped reduce the risk of burnout by providing relevant information for effective management of the disease. In the context of health care, a holistic and individualized method was essential. Health care providers played a key role by providing psychological counseling, stress management training, and health education designed for the needs of each individual.

ACKNOWLEDGEMENT

Our gratitude goes to LPPM Ngudi Waluyo University for facilitating the implementation of this research. We also express our gratitude to the Semarang Regency Health Office for their cooperation and to the participants who have agreed to participate in this research.

REFERENCES

1. WHO. Diabetes [Internet]. WHO. 2024. Available from: https://www.who.int/health-topics/diabetes#tab=tab_1
2. American Diabetes Association. Understanding diabetes and mental health [Internet]. ADA. 2022 [cited 2023 Feb 1]. Available from: https://diabetes.org/healthy-living/mental-health
3. Abdoli S, Miller-Bains K, Burr EM, Smither B, Vora A, Hessler D. Burnout, distress, and depressive symptoms in adults with type 1 diabetes. J Diabetes Complications [Internet]. 2020;34(7):107608. Available from: https://doi.org/10.1016/j.jdiacomp.2020.107608
4. Kalra S, Kapoor N JJ. The psychosocial impact of diabetes in aging populations. Diabetes Ther. 2022;13(7):1341–1354.
5. Trento M, Gamba S, Gentile S, Miselli V, Tomalino M et al. Diabetes burnout: an overlooked challenge in older adults with type 2 diabetes. BMC Public Health. 2023;23(1124).
6. Liu SY, Huang J, Dong QL, Li B, Zhao X, Xu R, et al. Diabetes distress, happiness, and its associated factors among type 2 diabetes mellitus patients with different therapies. Medicine (Baltimore) [Internet]. 2020;99(11):1–8. Available from: 10.1097/MD.0000000000018831
7. Yang F, Pang JS, Cheng WJY. Self-Care Adherence and Psychological Functioning of Older Patients with Type 2 Diabetes: Effects of Persuasion, Social Pressure, and Self-Efficacy. J Clin Psychol Med Settings. 2016;23(4):389–401.
8. Sari RN, Mulyati T SC. Diabetes distress and quality of life among adults with type 2 diabetes mellitus in Indonesia. BMC Endocr Disord. 2022;22(31).
9. Kontoangelos K, Raptis A, Lambadiari V, Economou M, Tsiori S, Katsi V, et al. Burnout Related to Diabetes Mellitus: A Critical Analysis. Clin Pract Epidemiol Ment Heal. 2022;18(1):1–12.
10. Study O, Esen SA. Fatigue and depression in elderly patients with poorly controlled diabetes. Medicine (Baltimore). 2022;45(101):1–7.
11. Kalra S, Jena BN, Yeravdekar R. Emotional and psychological needs of people with diabetes. Indian J Endocrinol Metab. 2018;22(5):696–704.
12. Tan SY, Magarey J, Chee SS, Lee LF LT. Self-care, self-efficacy, depression and distress in patients with type 2 diabetes in Singapore. BMC Public Health. 2020;20(1):1–12.
13. Mirzazadeh-qashqaei F. The relationship between and coping strategies in patients with type 2 diabetes mellitus. J Res Nurs. 2023;28(3):259–69.

14. Dinas Kesehatan Provinsi Jawa Tengah. Cakupan Pelayanan Kesehatan Usia Lanjut Menurut Kabupaten Kota Tahun 2023 [Internet]. Portal Data. 2024 [cited 2024 Jul 12]. Available from: data.jatengprov.go.id/de/dataset/cakupan-pelayanan-kesehatan-usia-lanjut-menurut-kabupaten-kota-tahun-2023?

15. Dinkes Jateng. Profil Kesehatan Provinsi Jawa Tengah Tahun 2023. 2023.

16. Abdoli S, Miller-Bains K, Fanti P, Silveira MSVM, Hessler D. Development and validation of a scale to measure diabetes burnout. J Clin Transl Endocrinol [Internet]. 2021;23:100251. Available from: https://doi.org/10.1016/j.jcte.2021.100251

17. Huang LC, Lin CL, Chang YT, Chen RY, Bai CH. Gender Impact on Diabetes Distress Focus at Medical Communication Concerns, Life and Interpersonal Stress. Int J Environ Res Public Health. 2022;19(23).

18. Zapater-fajarí M, Crespo-sanmiguel I, Pulopulos MM, Colman R. Resilience and Psychobiological Response to Stress in Older People : The Mediating Role of Coping Strategies. Front Aging Neurosci. 2021;13:1–15.

19. Auttama N, Kumar R, Somrongthong R, Tonchoy P, Panta P. Stress and associated risk factors among the elderly : a cross-sectional study from rural area of Thailand [version 2 ; peer review : 2 approved] Previously titled : Stress and associated risk factors among the elderly : a cross-sectional study from rur. Natl Libr Med. 2020;8(655):1–14.

20. Carla M Prado, John A Batsis, Lorenzo M Donini, M. Christina Gonzles MS. Sarcopenic obesity in older adults: a clinical overview. Nat Rev Endocrinol. 2024;20(5):261–77.

21. Ummu Muntamah, Puji Purwaningsih, Hardhono Susanto , AnnastasiaEdiati DL. A Qualitative Study Of Perceptions And Living Experiences With The Diagnosis of Diabetes Mellitus. J Ilmu Keperawatan Komunitas [Internet]. 2023;6(2):1–19. Available from: https://journal.ppnijateng.org/index.php/jikk/article/view/2252/940

22. Halim M, Halim A. Diabetes & Metabolic Syndrome : Clinical Research & Reviews The effects of in fl ammation , aging and oxidative stress on the pathogenesis of diabetes mellitus (type 2 diabetes). Diabetes Metab Syndr Clin Res Rev [Internet]. 2019;13(2):1165–72. Available from: https://doi.org/10.1016/j.dsx.2019.01.040

23. Zeng Q yue, Qin Y, Shi Y, Mu X yu. Systemic immune-in fl ammation index and all-cause and cause- speci fi c mortality in sarcopenia : a study from National Health and Nutrition Examination Survey 1999-2018. Front Immunol. 2024;4(15):1–12.

24. Mishra S, Rout SS, Mohanty P, Mohapatra N. Prevalence of Commorbidity among Elderly Hospitalized Patients in A Tertiary Care Centre of Odisha. Int J Acad Med Pharm. 2023;5(6):226–30.

25. Ali D, Tencerova M, Figeac F, Kassem M, Jafari A. The pathophysiology of osteoporosis in obesity and type 2 diabetes in aging women and men : The mechanisms and roles of increased bone marrow adiposity. Front Endocrininol. 2022;13(981487):1–16.

26. Muntamah Ummu, Susanto Hardhono, Ediati Annastasia DL. Efektifitas Model Intervensi Diabetes Distress Management “ASSESS” Berbasis Telehealth Terhadap Kualitas Hidup Penderita Diabetes Melitus Tipe 2 (Kajian pada parameter JCS, DDS-17 dan SDSCA pada penderita DM Tipe 2) [Internet]. University of Diponegoro; 2024. Available from: https://eprints2.undip.ac.id/id/eprint/24039/

27. Made Dian Kusumawati, Kusnanto BP. Comparison of the Effectiveness of Mindfulness Based Intervention on Diabetes Resilience Training on Diabetes Burnout Syndrome and Glycemic Control in Type 2 Diabetes Mellitus Patients. J Penelit Kesehat Suara Forikes. 2022;13(1):24–33.

28. Ilmiah J, Indonesia N, Shera SD, Hakam M, Widayati N, Keperawatan F, et al. The Relationship between Self-Empowerment and Emotional Intelligence of Type 2 Diabetes Mellitus Patients at

RSD dr. Soebandi Jember. J Ilm Ners Indones. 2024;5(2):110–9.

29. Bi Y, Zhang L, Li X, Kan Y, Li S, Zou Y, et al. Contributing factors of fatigue in patients with type 2 diabetes: A systematic review. Psychoneuroendocrinology [Internet]. 2021;130:105280. Available from: https://doi.org/10.1016/j.psyneuen.2021.105280

30. Kuo, Hsuan-Ju, Alexandra A. García CYH. Impact of Fatigue and Its Influencing Factors on Diabetes Self-Management in Adults With Type 2 Diabetes: A Structural Equation Modeling Analysis. Sage J. 2023;49(6).

31. Bhatt PP, Sheth MS. Comparison of fatigue and functional status in elderly type 2 diabetes patients versus age and gender matched individuals. Aging Med. 2024;7:84–9.

32. Abdoli S, Miller-Bains K, Burr EM, Smither B, Vora A, Hessler D. Burnout, distress, and depressive symptoms in adults with type 1 diabetes. J Diabetes Complications [Internet]. 2020;34(7):107608. Available from: https://doi.org/10.1016/j.jdiacomp.2020.107608

33. Li S, Fang L, Lee A, Hayter M, Zhang L, Bi Y, et al. The association between diabetes-related distress and fear of hypoglycaemia in patients with type 2 diabetes mellitus: A cross-sectional descriptive study. Nurs Open. 2021;8(4):1668–77.

34. Lehmann G, Ziebell P, Schmitt A, Kulzer B, Hermanns N, Ehrmann D. Explaining improvement in diabetes distress: a longitudinal analysis of the predictive relevance of resilience and acceptance in people with type 1 diabetes. Acta Diabetol [Internet]. 2024;61(2):151–9. Available from: https://doi.org/10.1007/s00592-023-02180-2

35. Gupta S, Solomon L, Jacob JJ. Diabetic distress and work-related stress among individuals with type 2 diabetes mellitus. Clin Diabetol. 2022;11(1):11–4.

36. Knowles SR, Apputhurai P, O'Brien CL, Ski CF, Thompson DR, Castle DJ. Exploring the relationships between illness perceptions, self-efficacy, coping strategies, psychological distress and quality of life in a cohort of adults with diabetes mellitus. Psychol Heal Med [Internet]. 2020;25(2):214–28. Available from: https://doi.org/10.1080/13548506.2019.1695865