

Reducing diabetes burnout syndrome using self-instructional training

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ABSTRACT

Patients with type 2 diabetes mellitus (T2DM) experienced diabetes burnout, which influences the patient's daily living. Some treatments had been introduced to reduce this burnout, but self-instructional training method remained unknown for its effectiveness. This study was aimed to analyse the influence of self-instructional training toward diabetes burnout syndrome. This research was a quasy-experimental study involving patients with diabetes mellitus type 2. About 72 respondents were chosen using purposive sampling. This study divided the respondents into control and treatment groups. The treatment group gained self-instructional training in 4 meetings. Data was obtained from pre-test and post-test using diabetes burnout scale questionnaire and analysed with Paired T-test and Independent T-test. Study results showed that the treatment group had a significant decrease in diabetes burnout (severe to low level) ($p=0.000$). Diabetes burnout score among treatment group was lower compared to the control group (24.69 ± 4.73 ; 19.19 ± 4.24). In the control group, there was no significant statistical reduction about diabetes burnout ($p=0.110$). Besides, this study presented the difference diabetes burnout syndrome between treatment and control group ($p=0.000$; $p<0.05$). This study showed self-instructional training could minimize the occurrence of diabetes burnout syndrome among T2DM patients. This method has been proven to influence patient's behaviour positively.

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1. INTRODUCTION

Diabetes mellitus was a major-complex health problems in the latest decade [1]. Various methods had been introduced in order to lower blood glucose level and improve the quality of life among type 2 diabetes mellitus (T2DM) patients, such as using natural-based medication, doing mind body practices, and whole system approach [2]. Previous study mentioned that physical exercises -for example aerobic exercise, resistance exercise, and leg exercise- was useful for managing blood glucose by reducing HbA1c levels, enhancing insulin sensitivity, and diminishing diabetes complications [3]–[5]. Besides, doing physical exercise could prevent the risk of neuropathy, repair periodontal tissue, and decrease bone loss [6], [7].

T2DM patients commonly experienced fatigue due to their medication process [8]. Various pathological and physical causes influenced the severity of fatigue symptoms, such as physical and functional independence, which decreased work capability [8]. A qualitative study mentioned that prolonged treatment

period, exhausted of life calamity, lack of financial support, and the advertisement of alternative medicine usage were being obstacles in medication adherence of diabetes mellitus [9]. Moreover, endocrine disturbance also intrigued fatigue occurrence, for instance uncontrolled glycemic status, hypothyroidism, chusing's syndrome, concomitant endocrinopathy, and diabetes complications [8]. A presence of diabetes complications increased treatment cost [10]. However, there was an integral form of diabetes fatigue and distress, namely diabetes burnout [1].

Diabetes burnout has been explained as exhaustion and frustration feeling associated with continuous daily disease management, which caused inconsistent behaviour of self-treatment [1]. T2DM patients with diabetes burnout frequently decreased adherence diabetes management and extremely tired of their unsatisfactory blood sugar control [11]. A study presented that low treatment compliance, depression, and diabetes complications among diabetes patients were mainly caused by diabetes burnout [12]. It also led to be a challenge of diabetes treatment [12]. Besides, educational background, age, and duration in suffering diabetes mellitus had a role in the emergence of diabetes burnout syndrome [13]. Diabetes burnout patients experienced apathy, avoided diabetes self-care and illness identity, feeling down, powerless, guilt, also fear [1].

Although there is a systematic review that proved diabetes distress had poor to moderate relationship with HbA1c levels, it is important to prevent and help people from diabetes burnout [12], [14]. Recently, pharmacological administration aimed to decrease fatigue level, depression, high proinflammatory cytokines, and improve patient's physical and psychological ability [8]. Patients also needed support from their family during treatment, especially emotional support [15], [16]. According to the recent research, diabetes self-management had positive impact to improve condition among patients with diabetes mellitus for six months to one year [17]. DM-calendar application, as diabetes self-management, enhancing patient's behaviour and self-efficacy to maintain low blood glucose level [18]. A qualitative study demonstrated that subjective strategies to encounter diabetes burnout were recognizing burnout, attaching with support systems, and adapting positive mindset [1]. Beforehand, traditional yoga training, cognitive behavioural therapy, mindfulness therapy, and diabetes resilience training were introduced to reduce burnout and increase quality of life [19], [20]. However, traditional yoga training, cognitive behavioural therapy, and mindfulness therapy involved patients with high motivation for treatment hence could not assess diabetes patient with less motivation and strength [19].

Current study mentioned that self-instructional training was being an approach to increase self-care [21]. This training also converted negative thoughts into positive thoughts, which could enhance self-care practice and patient's quality of life [21], [22]. Self-instructional training was proved to reduce blood glucose level among patients with diabetes mellitus [23]. This method was considered to be an effective way to improve behaviour among patients [24], [25]. However, there was a limited number of studies about the influence of self-instructional training to solve diabetes burnout syndrome among T2DM patients. Therefore, this study aimed to analyse the influence of self-instructional training toward diabetes burnout syndrome.

2. METHOD

Study protocols were approved by Research Ethical Committee of STIKES Karya Husada Kediri with No. 072/EC/LPPM/STIKES/KH/II/2020 and all research participants signed the informed consent. This research was a quasy experimental study involving patients with diabetes mellitus type 2 in the Kediri Region of Indonesia. Study participants were recruited using purposive sampling method. About 72 participants were divided into control and treatment groups according to the inclusion criteria. The inclusion criteria were patient with diabetes mellitus without experiencing kidney and heart complications, also without high level of any depression or anxiety disorder. To determine the psychological condition, this study employed hamilton anxiety rating scale (HARS). HARS scale was an anxiety examination according to the symptoms. Patients came from various sexual identities and aged from 30-70 years. Patients who were not able to complete all the intervention procedures and experience physical weakness would be excluded from this study. All the research procedures were conducted in February 2020.

Education module about diabetes was arranged for treatment group as an intervention of self-instructional training. Meichebaum arranged this self-instructional approaches. This training approaches was utilized to transform patient's cognition by providing knowledge hence they could organize or instruct themselves to change their behaviour [26]. This study required four sessions of meeting in a month. Each session was about a 60-minute intervention process. The first session was a focus group discussion (FGD) to identify the health problem. Patients were divided into 6 groups, which consist of six patients. This study involved 2 research assistants, who had the same perception about this study. FGD was carried out in 30 minutes to a group a day respectively for six days. The second session was providing health education about diabetes mellitus management with self-instructional training module. The third session was about nutritional management, physical exercise, and blood glucose monitoring. The fourth session was about pharmacological dan stress management. In the last session, participants had to fulfil diabetes burnout scale questionnaire as post-test.

Diabetes burnout scale was a valid and reliable instrument to examine diabetes burnout among individual with diabetes mellitus type 2 [12]. This instrument provided a contribution in the improvement of diabetes research with evaluated diabetes burnout and influenced clinical technique to enhance psycho-social treatment of diabetes mellitus patients. There were 3 determined aspects, such as burnout, detachment, dan uncontrol diabetes management. This diabetes burnout scale questionnaire consisted of 12 questions with 5 points likert scale (1=strongly disagree, 5=strongly agree). Since it was adopted from previous research, which used English version, this study did the back translation process to Bahasa Indonesia. Moreover, the instrument passed the validity and reliability test. All obtained data were categorized into mild, moderate, and severe categories. Furthermore, they were analysed using univariate and bivariate analysis. Univariate analysis examined the distribution of data frequency, while bivariate analysis used independent T-test with significant level of 0.05.

3. RESULTS AND DISCUSSION

This study divided study participants into 2 groups: control and treatment group; with consisted of 36 participants in each group (see Table 1). Both control and treatment group showed that female participants held major percentage. More than half participants aged 51-60 years, while participants aged 30-40 years appeared in a little number. The most participants in all groups had finished junior and senior high school as their educational background. Almost half of the participants have suffered from diabetes mellitus for 4-6 years.

Table 1. Sociodemographic characteristic

Sociodemographic characteristic	Control grup (n=36)		Treatment grup (n=36)	
	n	%	n	%
Gender				
Male	9	25	10	27
Female	27	75	26	73
Age				
30-40 years	2	6	1	3
41-50 years	10	28	6	17
51-60 years	18	50	20	55
61-70 years	6	16	9	25
Level education				
Primary school	3	8.3	6	16.7
Junior high school	12	33.3	14	38.9
Senior high school	12	33.3	9	25.0
Bachelor degree	9	25	7	19.4
Length of DM history				
0-3 years	4	11.4	2	5.6
4-6 years	15	41.7	16	44.4
7-9 years	11	30.6	11	30.6
10-12 years	6	16.7	7	19.4

According to the pretest result, participants in both control and treatment group showed a high percentage in moderate level of diabetes burnout syndrome. After treatment administration, the post-test result showed that there was no patient with severe diabetes burnout syndrome, while an increasing percentage emerged in the mild diabetes burnout syndrome (Table 2). A decrease amount also happened in treatment group with moderate diabetes burnout syndrome (66.7%). On the other hand, the number of patients with mild diabetes burnout syndrome in the control group remained stable. The increasing number of control groups occurred in the moderate level, while severe level presented half decreasing. The statistical test resulted in a significant difference between treatment and control group ($p=0.000$).

Table 2. The effect of self-instructional training on diabetes burnout syndrome among diabetes mellitus type 2

Diabetes burnout syndrome	Treatment (n=36)				Control (n=36)			
	Pretest		Post-test		Pretest		Post-test	
	n	%	n	%	n	%	n	%
DBS mild	3	8.3	12	33.3	3	8.3	3	8.3
DBS moderate	30	83.3	24	66.7	29	80.6	31	86.1
DBS severe	3	8.3	0	0	4	11.1	2	5.6
p*	0.000				0.110			
p**			0.000					
Mean±SD	24.69±4.73		19.19±4.24		25.30±4.93		24.4±4.65	
Min±Max	15±33		13±39		16±34		16±34	

* Paired T-test; **Independent-samples t-test; significantly ($p<0.05$)

This study result explained that treatment group showed burnout reduction significantly among diabetes patients (severe DBS to mild DBS) ($p=0.000$; $p<0.05$). Diabetes burnout score in the treatment group (pre-test – post-test) was lower compared to the control group (24.69 ± 4.73 ; 19.19 ± 4.24). This result presented that self-instructional training could decrease diabetes burnout syndrome among patients with T2DM. Burnout syndrome could be reduced among treatment groups since self-instructional training was a therapy phase, which supported other patients physically and physiologically. Patients had been given recommendations and technical strategies to encourage other hopeless patients. Intensive activity would strengthen patient's soul to less experience burnout due to T2DM. On the other hand, burnout among control group could not be reduced because of physical-focused treatment and did not explain psychological and emotional dimension.

Burnout has been characterized by physical and physiological fatigue, hopelessness, inability to do self-control, and reinforced by potential predisposition factors related to T2DM. It was caused by poor support systems, lack understanding about diabetes, and lifestyle adjustment [27]. Previous qualitative study mentioned that diabetes patients also experienced exhaustion and powerless, which led to low diabetes outcomes [28]. This condition emerged since there was a lack of physical and psychological energy to accomplish daily diabetes treatments [12]. Patients were experienced commitment reduction of doing self-care, lack of motivation, and had low support systems and current identity [12]. On the other hand, a proper self-treatment was needed to fulfil patient's optimum condition physically and mentally [29]. This could be solved by developing social support and self-acceptance [28]. Previous studies had also explored various diabetes burnout syndrome interventions, but those interventions required more explanation about the effectiveness.

Self-instructional training was being technical method in cognitive therapy nowadays [30]. This treatment was an educational method using problem solving approaches according to the patient's capability. This intervention prepared patients with self-care understanding [31]. Besides, it was a training approach to change patient's cognition using knowledge, hence patients could arrange or manage themselves to change their behaviour [26]. T2DM patients would less experience fatigue if they had more understanding about self-care implementation after gaining self-instructional training. It was expected that knowledge development contributed to the treatment successful [31]. This increased patient's learning capability by reflecting their past experiences and deciding the most suitable self-care practices [21], [32]. Moreover, self-instructional training methods improve patient's awareness by changing negative mindset into positive idea. Therefore, it induced implementation discipline about self-care and elevated patient's quality of life [21].

Almost entire respondents among control and treatment group were women (73-75%) according to their gender. This study was in-line with the other research result, which mentioned that majority T2DM patients were women due to their physical weakness, emotional, social disfunction, biomolecular disorder, and stigmatized [33], [34]. According to this research result, most patients are aged from 51 to 60 years. Another research found that age was associated to the T2DM development due to the aging process because of insulin resistance [35], [36]. Long-term T2DM treatment caused diabetes burnout. The higher proportion of respondents with more than three years experiencing T2DM influenced higher prevalence of diabetes burnout syndrome. Experiencing long-term chronic disease would intrigue boredom and cause hopelessness [37], [38].

4. CONCLUSION

Burnout syndrome among patients with T2DM was reduced because of self-instructional intervention. This intervention could be performed at home independently by the patients. However, related health professionals also needed to guide patients before doing self-instructional training in their personal place. Besides, it is needed to monitor burnout condition periodically to prevent treatment disobedience, which potentially caused worse complication. Therefore, it would recommend health professionals, especially clinical nurses, to apply this method in order to improve T2DM patient's self-care and their medication, and also strengthen their self-control ability.

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REFERENCES




- [1] S. Abdoli, D. Hessler, A. Vora, B. Smither, and H. Stuckey, "Experiences of diabetes burnout: a qualitative study among people with type 1 diabetes," *AJN, American Journal of Nursing*, vol. 119, no. 12, pp. 22–31, Dec. 2019, doi: 10.1097/01.NAJ.0000615776.64043.be.

- [2] E. Setiyorini *et al.*, “Complementary and alternative medicine for glycemic control of diabetes mellitus: A systematic review,” *Journal of Public Health Research*, vol. 11, no. 3, p. 227990362211065, Jul. 2022, doi: 10.1177/22799036221106582.
- [3] Y. Kurniawati, H. A. Baridah, M. D. Kusumawati, and I. Wabula, “Effectiveness of physical exercise on the glycemic control of type 2 diabetes mellitus patients: a systematic review,” *Jurnal Ners*, vol. 14, no. 3, pp. 199–204, Jan. 2020, doi: 10.20473/jn.v14i3.17059.
- [4] S. Embuai, H. Tuasikal, and M. Siauta, “Effect of foot exercise and care on peripheral vascular status in patients with diabetes mellitus,” *Jurnal Ners*, vol. 14, no. 3, pp. 5–12, Dec. 2019, doi: 10.20473/jn.v14i3.16943.
- [5] I. Trisnawati, I. K. Sudiana, and S. Supriyanto, “Effect of leg exercise on the lower limb circulation of patients with diabetes mellitus: a systematic review,” *Jurnal Ners*, vol. 15, no. 1Sp, pp. 497–507, Jul. 2020, doi: 10.20473/jn.v15i1Sp.20518.
- [6] L. Hidayati, I. N. Pratiwi, Z. Pawanis, L. McKenna, and I. Y. Widyawati, “Buerger exercise reduces the risk of neuropathy in people with diabetes mellitus,” *Open Access Macedonian Journal of Medical Sciences*, vol. 9, no. G, pp. 94–99, Sep. 2021, doi: 10.3889/oamjms.2021.6743.
- [7] K. Mundiratri, N. C. Herdianti, and A. Irmawati, “Effect of exercise on periodontal tissues of diabetes mellitus type 2 patient: A review,” *Biochemical and Cellular Archives*, vol. 20, pp. 2907–2912, 2020, doi: 10.35124/bca.2020.20.S1.2907.
- [8] B. F. Hidayat, T. Sukartini, and T. Kusumaningrum, “A systematic review of fatigue in type 2 diabetes,” *Jurnal Ners*, vol. 15, no. 1Sp, pp. 513–517, Jul. 2020, doi: 10.20473/jn.v15i1Sp.20520.
- [9] F. Mostafavi, F. Z. Alavijeh, A. Salahshouri, and B. Mahaki, “The psychosocial barriers to medication adherence of patients with type 2 diabetes: a qualitative study,” *BioPsychoSocial Medicine*, vol. 15, no. 1, p. 1, Dec. 2021, doi: 10.1186/s13030-020-00202-x.
- [10] Y. F. P. Patty, Y. Nita, and Libriansyah, “Cost of illness analysis of diabetes mellitus with complications in one hospital in Surabaya,” *Pharmacy Education*, vol. 22, no. 2, pp. 254–258, Mar. 2022, doi: 10.46542/pe.2022.222.254258.
- [11] N. Świątoniowska, K. Sarzyńska, A. Szymańska-Chabowska, and B. Jankowska-Polańska, “The role of education in type 2 diabetes treatment,” *Diabetes Research and Clinical Practice*, vol. 151, no. 2019, pp. 237–246, May 2019, doi: 10.1016/j.diabres.2019.04.004.
- [12] S. Abdoli, D. Hessler, M. Doosti-Irani, B. P. Chang, and H. Stuckey, “The value of measuring diabetes burnout,” *Current Diabetes Reports*, vol. 21, no. 8, p. 25, Aug. 2021, doi: 10.1007/s11892-021-01392-6.
- [13] N. A. Nuari, D. Widayati, L. P. Lestari, C. Destri, and H. Mawarti, “Diabetes burnout syndrome and its relationship to the resiliency of efficacy diabetes mellitus type 2 patients,” *International Journal of Pharmaceutical Research*, vol. 10, no. 4, pp. 434–438, Dec. 2018, doi: 10.31838/ijpr/2018.10.04.071.
- [14] Z. K. Wibowo, S. W. Mudjanarko, and K. Khairina, “The relationship between diabetes distress and HbA1C level in type 2 diabetes mellitus therapy patients: a systematic review,” *Bali Medical Journal*, vol. 11, no. 1, pp. 476–484, Apr. 2022, doi: 10.15562/bmj.v11i1.2986.
- [15] D. N. Zafrah, L. Pristianty, A. Rahem, and Y. Priyandani, “Relationship between family support and compliance in diabetes mellitus patients,” *Pharmacy Education*, vol. 22, no. 2, pp. 267–269, Mar. 2022, doi: 10.46542/pe.2022.222.267269.
- [16] I. Wulandari, K. Kusnanto, S. Wibisono, and A. Haryani, “Family support in caring for diabetes mellitus patient: patient’s perspective,” *Open Access Macedonian Journal of Medical Sciences*, vol. 9, no. T4, pp. 199–205, Apr. 2021, doi: 10.3889/oamjms.2021.5778.
- [17] N. Fajriyah, T. A. Firmanti, A. Mufidah, and N. T. Septiana, “A diabetes self-management education/support (DSME/S) program in reference to the biological, psychological and social aspects of a patient with type 2 diabetes mellitus: a systematic review,” *Jurnal Ners*, vol. 14, no. 3, pp. 55–64, Dec. 2019, doi: 10.20473/jn.v14i3.16979.
- [18] Kusnanto, K. A. J. Widyana, Suprajitno, and H. Arifin, “DM-calendar app as a diabetes self-management education on adult type 2 diabetes mellitus: a randomized controlled trial,” *Journal of Diabetes & Metabolic Disorders*, vol. 18, no. 2, pp. 557–563, Dec. 2019, doi: 10.1007/s40200-019-00468-1.
- [19] A. Grensman *et al.*, “Effect of traditional yoga, mindfulness-based cognitive therapy, and cognitive behavioral therapy, on health related quality of life: a randomized controlled trial on patients on sick leave because of burnout,” *BMC Complementary and Alternative Medicine*, vol. 18, no. 1, p. 80, Dec. 2018, doi: 10.1186/s12906-018-2141-9.
- [20] M. D. Kusumawati, K. Kusnanto, and B. Purwanto, “Comparison of the effectiveness of mindfulness based intervention with diabetes resilience training on diabetes burnout syndrome and glycemic control of patients with type 2 diabetes mellitus (in Indonesian: *Perbandingan Efektivitas Mindfulness Based Intervention Terhadap Diabetes Resilience Training pada Diabetes Burnout Syndrome dan Kontrol Glikemik Penderita Diabetes Melitus Tipe 2*),” *Jurnal Penelitian Kesehatan “SUARA FORIKES” (Journal of Health Research “Forikes Voice”)*, vol. 13, no. 1, pp. 24–33, Jan. 2021, doi: 10.33846/sf.v13i1.1648.
- [21] S. Wahyuni, C. D. Prasetyowati, W. N. Pratiwi, and K. Alfadi, “Self-instructional training application on diabetic patients’ self-care behaviors,” *Nurse Media Journal of Nursing*, vol. 11, no. 2, pp. 268–277, Aug. 2021, doi: 10.14710/nmjn.v11i2.29360.
- [22] K. A. Mahatmaharti, D. P. N. Brata, and M. B. N. Wajdi, “Cognitive modeling effect: enhancing student self discipline through self instructional training,” *International Journal of Mechanical Engineering and Technology (IJMET)*, vol. 10, no. 03, pp. 818–827, 2019.
- [23] N. A. Nuari, “Self instructional training methods to reduce blood glucose levels type 2 diabetes mellitus,” *Jurnal Ners dan Kebidanan (Journal of Ners and Midwifery)*, vol. 4, no. 1, pp. 006–011, Apr. 2017, doi: 10.26699/jnk.v4i1.ART.p006-011.
- [24] A. L. Daniel, K. Pedreira, G. L. Martin, and T. Martin, “Evaluation of a self-instructional package for training ABA service providers to conduct the assessment of basic learning abilities – Revised,” *Education and Training in Autism and Developmental Disabilities*, vol. 55, no. 2, pp. 215–227, 2020.
- [25] G. W. Rivera Flores, “Self-instructional cognitive training to reduce impulsive cognitive style in children with attention deficit with hyperactivity disorder,” *Electronic Journal of Research in Education Psychology*, vol. 13, no. 1, pp. 27–46, Dec. 2015, doi: 10.14204/ejrep.35.13051.
- [26] R. D. Nawantara, “Self instructional (potential counseling technique in school setting),” in *The 1st International Conference on Islamic Guidance and Counseling 2018*, 2018, no. November, pp. 155–161.
- [27] A. Wingert, N. Johnson, and S. T. Melton, “Young adults with type 1 diabetes,” *AADE in Practice*, vol. 3, no. 2, pp. 36–40, Mar. 2015, doi: 10.1177/2325160315570961.
- [28] V. S. Helgeson, “Diabetes burnout among emerging adults with type 1 diabetes: a mixed methods investigation,” *Journal of Behavioral Medicine*, vol. 44, no. 3, pp. 368–378, Jun. 2021, doi: 10.1007/s10865-020-00198-3.
- [29] H. Ebrahimi, M. Sadeghi, F. Amanpour, and H. Vahedi, “Evaluation of empowerment model on indicators of metabolic control in patients with type 2 diabetes, a randomized clinical trial study,” *Primary Care Diabetes*, vol. 10, no. 2, pp. 129–135, Apr. 2016, doi: 10.1016/j.pcd.2015.09.003.
- [30] N. Mahadi, S. N. Abdullah, and S. Baskaran, “A review of social cognitive theory and self-care for type 2 diabetes mellitus patients,” *Business Management and Strategy*, vol. 11, no. 1, p. 148, May 2020, doi: 10.5296/bms.v11i1.16961.




- [31] S. Thomas and V. Mohite, "Effectiveness of self instructional module on the knowledge regarding diabetic diet among diabetic patients," *International Journal of Science and Research (IJSR)*, vol. 3, no. 6, pp. 672–678, 2014.
- [32] N. Hamdan *et al.*, "An effectiveness of high order thinking skills (HOTS) self instructional manual for students' assignment achievement," *Journal of Technical Education and Training*, vol. 11, no. 1, pp. 63–72, Mar. 2019, doi: 10.30880/jtet.2019.11.01.008.
- [33] H. Arifin, K. Kusnanto, E. D. Wahyuni, and R. O. Pradipta, "Diabetes resilience training on self-care, glycemic control, and diabetes burnout of adult type 2 diabetes mellitus," *Indonesian Nursing Journal of Education and Clinic (INJEC)*, vol. 4, no. 2, p. 90, Dec. 2019, doi: 10.24990/injec.v4i2.252.
- [34] R. Eknithiset, R. Samrongthong, and R. Kumar, "Factors associated with knowledge, perception, and practice toward self-care among elderly patients suffering from type 2 diabetes mellitus in rural Thailand," *Journal of Ayub Medical College, Abbottabad: JAMC*, vol. 30, no. 1, pp. 107–110, 2018.
- [35] M. Banerjee, S. Chakraborty, and R. Pal, "Diabetes self-management amid COVID-19 pandemic," *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, vol. 14, no. 4, pp. 351–354, Jul. 2020, doi: 10.1016/j.dsx.2020.04.013.
- [36] B. C. Salazar-González, E. C. Gallegos-Cabrales, A. Rivera-Castillo, A. González-Cantú, M. V. Gómez-Meza, and J. Z. Villarreal-Pérez, "Factors associated with glycemic status and ability to adapt to changing demands in people with and without type 2 diabetes mellitus: A cross-sectional study," *SAGE Open Medicine*, vol. 6, p. 205031211876993, Jan. 2018, doi: 10.1177/2050312118769930.
- [37] S. Nouhjah and S. Jahanfar, "Challenges of diabetes care management in developing countries with a high incidence of COVID-19: A brief report," *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, vol. 14, no. 5, pp. 731–732, Sep. 2020, doi: 10.1016/j.dsx.2020.05.012.
- [38] M. Riant *et al.*, "Associations between long-term exposure to air pollution, glycosylated hemoglobin, fasting blood glucose and diabetes mellitus in northern France," *Environment International*, vol. 120, pp. 121–129, Nov. 2018, doi: 10.1016/j.envint.2018.07.034.

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