The Review Of
DIABETIC
STUDIES OPEN ACCESS

Navigating The Involvement Of Cadres (POSBINDU) Through The Utilization Of "Dering DM" Application In Improving Self-Management Of Type 2 DM Survivors

Heni Nur Kusumawati[1], Yulia Lanti Retno Dewi[2], Sri Kusumo Hapsari[3], Sri Mulyani[4]

[1]Faculty of Community Development and Empowerment, Sebelas Maret University, Surakarta, Indonesia
[2] Sebelas Maret University, Surakarta, Indonesia
[3] Sebelas Maret University, Surakarta, Indonesia
[4] Sebelas Maret University, Surakarta, Indonesia
Address correspon- dence to: João E. dos Santos Araujo, e-mail: araujo_jes@yahoo.com.br
Manuscript submitted September 6, 2018; resubmitted December 12, 2018; accepted February 4, 2019

Abstract

Type 2 diabetes mellitus (DM) is the most prevalent form of diabetes, accounting for over 90% of all cases worldwide. The increasing global burden of DM is partly attributable to a substantial population of individuals with undiagnosed type 2 DM who remain asymptomatic or untreated. Strengthening diagnostic capacities is therefore essential to facilitate timely intervention and improve clinical outcomes. Community engagement plays a pivotal role in mitigating the DM burden, with initiatives such as POSBINDU, a component of Community-Based Health Efforts (Upaya Kesehatan Berbasis Masyarakat, UKBM), and serving as a critical platform. However, POSBINDU cadres have yet to be systematically

engaged in providing support and monitoring for survivors of natural disasters, particularly those lacking access to digital health applications. Advancements in health technology, exemplified by tools like Dering DM, offer significant potential to enhance self-management and improve the quality of life for individuals with DM. To further strengthen community participation, optimizing the role of POSBINDU cadres is imperative, ensuring their active involvement in both routine care and crisis response

Keywords: Cadres, Type 2 Diabetes Mellitus (DM), Self-management, Survivors.

1. Introduction

The persistent surge in DM incidence can be attributed to the substantial population of type 2 DM individuals who have not been identified through diagnosis. Therefore, it is imperative to enhance the capacity for diagnosing individuals with diabetes in order to facilitate early treatment [1]. Regency or City Governments are required to provide health care, in accordance with established criteria, to all individuals with DM as part of their efforts in secondary prevention within their area of authority [2].

The existing Integrated Development Post (POSBINDU) in the community has not been effectively utilized and integrated into an application for POSBINDU activities conducted by cadres to enhance the scope of health monitoring, particularly for type 2 DM. The existing type 2 DM application has a restricted user base [3]. Only individuals with type 2 diabetes mellitus who have survived and had reduced social interaction. This does not align with the requirements of the Prolanis initiative, which necessitates the involvement of the community [4]. POSBINDU cadres have not directly participated in offering aid and supervision to survivors of natural disasters who lack the capability to utilize the program [5].

As of today, the administration of health issues continues to present a challenge in the context of self-management [6]. Solutions that can be used to improve self-

management and improve the quality of life of patients are by utilizing technology that is currently developing rapidly, especially in the health sector and increasing community participation, such as optimizing the role of POSBINDU cadres. The term "mHealth" refers to a specific type of existing technology in the healthcare industry [7].

DM treatment is significantly impacted by the patient's level of independence in managing diabetic care, which includes maintaining a healthy diet, determining whether to engage in physical activity, controlling blood sugar levels, and using insulin (both in terms of the timing of administration and the dosage) [8]. 4 Implementing Diabetes Self-Management Education (DSME) along with the collaboration of Community Health Workers (CHW) and Peer Leaders (PL) has been proven to save costs and enhance the effectiveness of self-management assistance. 5 Meanwhile, it has been observed that the Central Java Health Service, including in the District Sukoharjo, allocates a greater portion of its budget towards curative activities rather than promotive and preventive activities.6 Through the implementation of an IT-based promotion model, it is expected that patients with type 2 DM will benefit from self-management support provided by POSBINDU cadres. This approach aims to have a positive impact on their health outcomes.

The POSBINDU cadres are actively engaged in the management of DM as part of the POSBINDU program, which has the objective of identifying and preventing risk factors associated with non-communicable diseases. The Information-Motivation-Behavioral (IMB) Skills Model suggests that the knowledge, drive, and actions of POSBINDU cadres play a crucial role in shaping health behavior. The participation of POSBINDU cadres in offering encouragement and assistance through the "Dering DM" application is anticipated to aid individuals with type 2 DM in attaining effective self-management by enhancing their self-confidence [9].

2. Methods

Data Source and Study Population

The methods employed in this investigation were research and development, specifically R&D (investigation and Development). This approach is implemented to generate products and evaluate the efficacy of the research product [10]. The research concept was supported by the simultaneous collection of qualitative and quantitative data in the initial stage of the study, which was conducted using a mix method approach and an embedded design approach strategy. The supportive variable is the variable that will be investigated and questioned in each approach [11].

An in-depth interview method was implemented with informants in the vicinity of the Nguter Sukoharjo Community Health Center. The objective of this method was to offer a comprehensive overview of the research topic. In accordance with the rule of adequacy, the data collected from informants must cover all activities that are relevant to the research topic [12]. In this case, there were a total of 13 informants [13].

The surveyed population consisted of individuals who had survived type 2 diabetes mellitus and were receiving care at four Community Health Centers in Sukoharjo Regency. The process of selecting subjects was conducted using a straightforward random sampling technique. This implies that any husband within the study population has an equal chance of being chosen as a research participant [14]. The objective is to choose individuals who can accurately reflect the entire population. The study population consisted of all individuals who had survived type 2 DM in Sukoharjo Regency. The sampling of Puskesmas will be conducted using purposive sampling method, selecting 4 out of 12 Puskesmas. Two Puskesmas will be chosen

to represent rural areas, particularly Bendosari Health Center and Bulu Health Center. Similarly, two health facilities, Grogol Health Center and Kartasuro Health Center, will be picked to represent metropolitan areas [15].

Subsequently, participants were chosen through a randomized experimental block design. The randomization of experimental block design involved grouping participants or experimental units into blocks, and then randomly assigning different treatments to units within each block. Randomly blocking could assist researchers in controlling for possibly confounding variables.7 A total of 12 POSBINDUs were randomly chosen to act as block units, divided into two groups: a control group and an intervention group. Each group will consist of 25 subjects from the control posyandu and 25 individuals receiving the intervention, resulting in a total of 300 research subjects [16].

The participants were divided into two groups: the intervention group and the control group. The intervention group consisted of individuals who had survived type 2 DM and were provided mentorship-based POSBINDU cadre assistance through the "Dering DM" application. On the other hand, the control group comprised type 2 DM survivors who received mentorship-based POSBINDU cadre assistance without the use of media [17].

General Characteristics

The data reveals that a significant majority of respondents, specifically 218 individuals (72.7%), were women. A majority of the respondents, specifically 146 individuals (48.7%), fell within the age range of 56-65 years. Conversely, a minority of only 13 individuals (4.3%) were below the age of 45. The majority of respondents, accounting for 55.7%, obtained their education from SMA/MA. A total of 28 individuals successfully completed their elementary education, accounting for 9.3% of the total. According to the data, the majority of the respondents (48.3%) were not employed, while a small percentage (1.7%) worked as civil servants. In regards to POSBINDU cadres, it is worth noting that the majority of the 324 cadres fall within the age range of 41-50 years old, accounting for 44% of the total. On the other hand, the age group of 25-30 years old is the least represented, with only 19 individuals, making up 3% of the total. In terms of cadre experience, 45% of individuals have an average of more than 10 years of experience, while 8% have at least 1-2 years of experience as a cadre. There is a significant disparity in the number of cadres at different levels. The Purnama posyandu level has the highest number of cadres, with 317 individuals accounting for 43% of the total. On the other hand, the Intermediate level has the lowest number of cadres, with only 103 people making up 14%. Disparities that Occur in Rural and Urban Communities in Carrying Out Type 2 DM Control/Inspection

The research findings indicate that the decline in rural informants' interest in carrying out controls and inspections can be attributed to distance [18]. Rural communities typically have limited access to information compared to their urban counterparts. Family and POSBINDU Cadre Support for Type 2 DM Survivors in Carrying Out Self-Management [19].

The research findings indicate that individuals who have experienced type 2 diabetes can effectively practice self-management with the help of comprehensive knowledge on its application in their everyday routines. According to the statement, self-management terms pertain to the regular activities or actions individuals must undertake to exert control over or minimize the effects of a disease on their overall health and well-being, with the aim of preventing its progression [20].

From the results of in-depth interviews, it can be concluded that family support also plays an important role in the self-management of type 2 diabetes survivors.

Families who are actively involved in supporting survivors' needs, both in terms of managing diet, exercising together, and providing emotional support, can strengthen management efforts. survivor self. The role of the family in improving self-management in type 2 DM survivors is necessary for successful care. This is supported by the statement that self-management support refers to policies or people who support self-management behavior at all ages and is not specific to the education process. 10 This is due to the fact that there are several factors that can affect self-management behavior, including family support [21]. Additionally, prior research indicates that the correlation between self-management and family support is substantial [22].

The provision of social support by the Community Health Center, particularly through a home visit program conducted by trained individuals, is an extremely beneficial measure in assisting those who have had type 2 DM.8 This program offers both emotional support and essential instruction on healthy lives to survivors and their families. Home visits conducted by Community Health Center cadres provide survivors and their families with information in a personalized and familiar setting. This can enhance the knowledge they have acquired about diabetic self-management, while also offering a chance to inquire and resolve any uncertainties they may have. In addition, this program offers survivors and their families the chance to get social assistance from their immediate surroundings [23].

Changes in Self-Management in Type 2 DM Survivors

Self-management encompasses the regular tasks and behaviors that individuals must undertake to exert control over their health and mitigate the effects of an illness, thereby preventing its progression. 8,9. Effective self-management techniques can assist those who have Type 2 diabetes mellitus in overcoming their challenges. Patients who engage in self-management of chronic conditions experience several benefits, such as less reliance on healthcare resources and enhanced quality of life. It is crucial for individuals to independently recognize any issues or the necessity for greater self-care [24].

Diabetes self-management include essential behavioral tasks, including adhering to medicine, engaging in physical activity, monitoring blood sugar levels, minimizing risk factors, problem-solving, and adopting good coping mechanisms. These acts are crucial for effectively managing the disease. Patients exhibit varying levels of adherence to diabetic self-management, indicating that the decision-making process for self-management is influenced by a range of circumstances that can either facilitate or hinder it. Self-management support encompasses policies and individuals that facilitate self-directed behavior across all age groups, and is not limited to the context of education. 10 In addition, self-management assistance in diabetes refers to a method aimed at enhancing the capacity of individuals with diabetes to effectively manage their illness on their own. 13 This study focuses on the availability of a patient application called "Dering DM" that can be accessed conveniently at any time [25].

Changes in Self-Efficacy in Type 2 DM Survivors

Self-efficacy refers to an individual's evaluation of their capacity to successfully accomplish a specific task. Improving diabetes management requires a strong sense of self-efficacy. Self-efficacy refers to the belief in one's own capability to successfully perform the required actions. Self-efficacy refers to the process of evaluating one's ability to perform various actions, regardless of their moral implications or correctness, and determining whether one is capable of meeting the necessary requirements. There is a distinction between aspirations and self-efficacy.

Aspirations refer to ideal goals that one aims to achieve, whereas self-efficacy pertains to an individual's evaluation of their own abilities. 14 Self-efficacy plays a crucial role as a mediator between behavioral factors and the environment, influencing personal factors [26].

In particular, the concept of self-efficacy in this study pertains to the perception of confidence among individuals with type 2 DM in their ability to engage in self-management activities, specifically in relation to their capacity for self-care management. In order to assess changes in self-efficacy among survivors, it is necessary to seek assistance from POSBINDU cadres through the Dering DM application. This will help determine any changes in self-confidence and behavior among DM patient survivors that can contribute to their recovery. These behaviors include adhering to diet and exercise activities, diligently monitoring blood sugar levels, and following foot treatment and therapy [27].

Analysis

To determine whether there were disparities in pre-test and post-test scores between the control group and the intervention group, the Wilcoxon test was implemented to evaluate variations in self-management in the treatment group and the control group. There was no difference in the pre-test and post-test scores for self-management variables in the control group, as evidenced by a p-value of 0.322 (>0.05). In the meantime, the Wilcoxon test results for the pre-test and post-test scores of self-management in the intervention group yielded a p-value of 0.000 (<0.05), indicating that there is a difference in the pre-test and post-test scores of self-management in the intervention group [28].

3. Results

Changes in Self-Management in Type 2 DM Survivors

Wilcoxon statistical tests were implemented to evaluate modifications in self-management among survivors of type 2 diabetes mellitus. results of the Wilcoxon test for the control and intervention groups' self-management scores at the pre-test and post-test. There was no difference in the pre-test and post-test scores for self-management variables in the control group, as evidenced by a p-value of 0.322 (>0.05). Therefore, it can be inferred that the "Dering DM" application does not have any impact on the self-management of type 2 DM survivors in the control group. In the meantime, the Wilcoxon test results for the pre-test and post-test scores of self-management in the intervention group generated a p-value of 0.000 (<0.05), indicating that there is a difference in the pre-test and post-test scores of self-management in the intervention group. Therefore, it can be inferred that the "Dering DM" application has an impact on the self-management of type 2 DM survivors [29].

Changes in Self-Efficacy in Type 2 DM Survivors

The Wilcoxon test was employed to analyze the pre-test and post-test scores of self-efficacy in the control and intervention groups. In the control group, the p-value was 0.586 (>0.05), indicating that there was no difference in the pre-test and post-test scores on self-efficacy. Therefore, it can be inferred that the self-management self-efficacy of type 2 DM survivors is not influenced by the "Dering DM" application. The intervention group exhibited a p-value of 0.000 (<0.05), indicating a significant difference in pre-test and post-test self-efficacy scores. Therefore, it can be inferred that the "Dering DM" application has an impact on self-efficacy in order to enhance the self-management of type 2 DM survivors [30]. The results of this study suggest that the confidence of type 2 diabetes patients in managing their condition can affect their self-efficacy. Effective diabetes management necessitates patient confidence

and determination. Belief is a critical and primary factor in the efficacy of therapy. The health belief model (HBM) is a conceptual framework that is employed to elucidate the process of achieving optimal behavior change. Prior study reported that if individuals are successful in surmounting perceived obstacles, achieving benefits, demonstrating self-efficacy, and surmounting threats, behavioral changes may result [31].The Mann-Whitney test generated a p-value of 0.000 (< 0.05), demonstrating a significant disparity in the average post-test self-efficacy score between the intervention group (who utilized the "Dering DM" application) and the control group (which did not use the "Dering DM" app) [32]. These data validate that the "Dering DM" program has a substantial influence on enhancing self-efficacy in self-management for individuals who have survived type 2 diabetes mellitus. Therefore, it can be inferred that the utilization of the "Dering DM" application is efficacious in enhancing the self-efficacy of individuals who have type 2 diabetes mellitus in effectively managing their condition. These findings make a significant contribution to our understanding of how these applications affect people, and they also lay the groundwork for developing better and more focused interventions in the future to enhance the quality of life for survivors of type 2 diabetes mellitus (T2DM) [33].

Discussion

This study utilized in-depth interviews with informants to gather information regarding the age at which they were initially affected and to establish a comprehensive understanding of those affected by DM. The informant further added that he lacked the bravery to disclose his diabetic condition, resulting in the sufferer hesitating to remind others about any dietary restrictions, if there were any [34]. In addition, individuals afflicted with DM frequently have a lack of awareness regarding their condition and deny having received a diagnosis for DM. Additionally, certain participants expressed that the current facilities may be insufficient, leading individuals with the illness to disregard their condition. Therefore, it may be inferred that individuals with DM can benefit from the use of media tools such as the "Dering DM" application to enhance their quality of life through self-management, aided by regular reminders provided by the program.

Based on the findings from in-depth interviews with type 2 DM survivors and their families, it is possible to gain a comprehensive understanding of the application of self-management in type 2 DM survivors. Based on this information, it can be tentatively concluded that individuals with type 2 diabetes mellitus (DM) can effectively engage in self-management practices if they possess adequate knowledge on how to execute such practices. This, in turn, can enhance the overall quality of life for type 2 DM patients. Informants in the POSBINDU program are also educated on how to recognize indicators of increased blood sugar levels in individuals who have survived type 2 diabetes mellitus. It is crucial to comprehend this knowledge in order to appropriately administer basic treatment and follow-up. In addition to the knowledge required for type 2 diabetes mellitus (DM) survivors for managing their condition, it is also important for POSBINDU cadres and the families of these survivors to comprehend this information. This understanding will enable them to actively contribute to the self-management of type 2 DM survivors. POSBINDU cadres educate survivors of type 2 DM and their families on self-management techniques, aiming to ensure proper implementation and support [35].

In addition to the individual's strong self-management skills, social support also plays a crucial role. The informant reported that the Community Health Center has organized teams to visit the homes of individuals who have type 2 diabetes mellitus (DM) in order to offer social support and provide instruction on healthy lifestyles to both the survivors and their families.7-9POSBINDU is a program designed to have

a favorable influence on the implementation of self-management for individuals who have survived type 2 diabetes mellitus. Participants in POSBINDU communities receive counseling, early identification of non-communicable diseases, and regular medical check-ups. 15 The counseling offered focuses on the management of non-communicable diseases (NCDs), namely diabetes mellitus (DM). This includes guidance on food, physical exercise, monitoring blood sugar levels, treatment options, disease control, and medication. The informant overseeing the PTM program feels that the POSBINDU program can aid in the timely identification of DM, enhance the knowledge of type 2 DM survivors and their families regarding self-management of DM, and improve family support in monitoring DM management [36].

All informants have reported that POSBINDU has been conducted on a monthly basis and in a routine manner. In addition to POSBINDU activities, mobile health centers are present in each village and are used to conduct early detection of DM. It is anticipated that the challenges encountered by residents will be mitigated and that immediate follow-up will be achieved through cross-sectoral coordination as a result of the early detection of DM that is optimized in multiple activities. POSBINDU PTM cadres play a significant role in the accomplishment of the Chronic Disease Management Program. Therefore, the Health Service or community health centers can serve as a "provision" in the endeavor to enhance the implementation of self-management for type 2 DM survivors by coaching cadres. Consequently, it is anticipated that POSBINDU cadres who have undergone training will be able to offer the necessary support [37].

Nevertheless, the results of this research indicate that not all POSBINDU training is conducted directly with cadres. Rather, POSBINDU cadres are trained by midwives at the Community Health Center who have completed PTM guide training. This is conducted to offer cadres who interact directly with PTM survivors, particularly those with type 2 DM, a means of comprehension or replenishment. Nevertheless, these constraints can be surmounted by ensuring that programs are well-coordinated, thereby facilitating the more efficient operation of cadre refreshment or empowerment. Informants who serve as policymakers also have a Proposed Activity Plan (RUK) that suggests training for PTM cadres [38].

Throughout the implementation of POSBINDU, the Community Health Center's Health Promotion Officer was available to offer health services, including the early detection of non-communicable diseases with the assistance of POSBINDU cadres. If residents are discovered in possession of PTM, they will be instructed to go to the Community Health Center for additional exams, which may include house visits. In addition to their involvement in activities at POSBINDU, cadres also participate in health promotion activities during PTM or in collaboration with environmental health initiatives, such as those implemented in schools and factories [39].

Despite the implementation of programs aimed at controlling and managing type 2 DM survivors, there are still difficulties that can hinder the program's success rate. The primary challenge often encountered is a deficiency in public awareness, encompassing both the awareness required to conduct inspections and the awareness needed to effectively apply sound DM (Disaster Management) practices. Informants have identified the lack of awareness among individuals with diabetes mellitus (DM) as the primary barrier to the success of the PTM management program. Typically, if individuals who have survived type 2 diabetes mellitus do not have any symptoms, they are less likely to actively manage or visit POSBINDU, resulting in a disruption of their therapy.16 The education provided has failed to effectively increase the frequency of visits from survivors of type 2 DM, thereby lacking a significant positive impact. Furthermore, village midwives and POSBINDU cadres have

encountered difficulties in reaching all individuals with type 2 DM who have not returned for follow-up visits to POSBINDU or health service institutions.17 The Non-Communicable Disease (NCD) control program, specifically targeting Type 2 Diabetes Mellitus, is monitored and evaluated by officers or health workers who conduct community-based surveillance to assess blood sugar levels, cholesterol levels, and blood pressure. In order to communicate the monitoring results to inhabitants on proper management. PTM is detected early at POSBINDU, however treatment is provided at health facilities [40].

Additionally, home visits were conducted to oversee and assess the management of individuals who had survived type 2 diabetes mellitus. Monitoring and evaluation were conducted at POSBINDU in rural regions during the education services provided at the end of the POSBINDU services [41]. Monitoring and evaluation may encompass the outcomes of blood glucose assessments and the regular practices of those who have survived type 2 diabetes mellitus for routine management [42]. During the monitoring process, individuals who had type 2 diabetes mellitus were provided with a monitoring book [43]. However, it should be noted that not all individuals with the condition received the book. If indications of DM are detected, a collaborative consultation will be conducted. DM survivors carry a monitoring book, also known as a report card, whenever they visit POSBINDU or require services at a health facility to obtain medication [44].

The informant expresses the desire for increased awareness among type 2 DM survivors regarding the use of mobile health (m-health) applications to manage their condition. This is in response to the lack of awareness among survivors about the importance of regular re-examinations at health service facilities [45]. The "Dering DM" application serves as a promotional and preventative tool for managing type 2 DM in the intervention group. The "Dering DM" program was utilized by POSBINDU cadres to mentor and monitor individuals who have type 2 DM. The "Dering DM" application was utilized on 6 occasions at Posyandu with the assistance of POSBINDU cadres [46].

4. Conclusions

In conclusion, the Integrated Service Post (POSBINDU) has demonstrated its effectiveness as a model for delivering comprehensive support and integrated health services to individuals living with type 2 diabetes mellitus (DM). By emphasizing education, routine health monitoring, and personalized support, the program not only enhances the quality of life for type 2 DM survivors but also promotes the adoption of effective self-management strategies. These interventions extend beyond individual benefits, contributing to broader public health efforts to control and manage non-communicable diseases at the community level.

The findings of this study underscore the critical role of POSBINDU PTM cadres in bolstering the success of the Chronic Disease Management Program (Program Pengelolaan Penyakit Kronis, Prolanis), particularly in the management of type 2 DM. Their unique and extensive access to the community positions them as highly effective agents of change, fostering improved self-management practices among DM survivors and driving sustainable health outcomes at the population level.

Acknowledgment

The authors extend their heartfelt gratitude to Sebelas Maret University, Surakarta, for its invaluable support and contributions to this study.

Author's Note

This article is a condensed version of the dissertation/doctoral paper of the first author,

which was completed at Sebelas Maret University.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID IDs

Heni Nur Kusumawati, https://orcid.org/0009-0000-7268-1958

Yulia Lanti Retno Dewi, https://orcid.org/0000-0001-8762-4200

Sri Mulyani, https://orcid.org/0000-0002-9998-2846

Sri Kusuma Habsari, https://orcid.org/0000-0003-1928-7403

Referencess

[1] I. D. Federation, Idf Diabetes Atlas 10th Edition. 2021.

[2] D. Z. Fuadah En N. F. Rahayu, "Pemanfaatan Pos Pembinaan Terpadu (Posbindu) Penyakit Tidak Menular (Ptm) Pada Penderita Hipertensi", J. Ners Dan Kebidanan (Journal Ners Midwifery), Vol 5, No 1, Bll 020–028, Apr 2018, Doi: 10.26699/Jnk.V5i1.Art.P020-028.

[3] S. D. H. Service, "2022 Non-Communicable Diseases Report", 2023.

[4] J. Große, H. Hornstein, U. Manuwald, J. Kugler, I. Glauche, En U. Rothe, "Incidence Of Diabetic Ketoacidosis Of New-Onset Type 1 Diabetes In Children And Adolescents In Different Countries Correlates With Human Development Index (Hdi): An Updated Systematic Review, Meta-Analysis, And Meta-Regression", Horm. Metab. Res., Vol 50, No 03, Bll 209–222, Mrt 2018, Doi: 10.1055/S-0044-102090.

[5] A. P. Gobeil-Lavoie, M. C. Chouinard, A. Danish, En C. Hudon, "Characteristics Of Self-Management Among Patients With Complex Health Needs: A Thematic Analysis Review", Bmj Open, Vol 9, No 5, 2019, Doi: 10.1136/Bmjopen-2018-028344.

[6] A. Cahn, A. Akirov, En I. Raz, "Digital Health Technology And Diabetes Management", J. Diabetes, Vol 10, No 1, Bll 10–17, 2017, Doi: 10.1111/1753-0407.12606.

[7] P. Parellangi, E. P. Wahyuni, K. Mustofa, B. Seda, En T. Tini, "Endurance Diabetes Foot Exercise Based On Family Centered Care (Edfe-Bfcc) To Reduce Blood Sugar Levels Patients Diabetes Mellitus Type 2", Heal. Notions, Vol 6, No 2, Bll 51–54, 2022, Doi: Https://Doi.Org/10.33846/Hn60201.

[8] M. S. Spencer Et Al., "Outcomes At 18 Months From A Community Health Worker And Peer Leader Diabetes Self-Management Program For Latino Adults", Diabetes Care, Vol 41, No 7, Bll 1414–1422, 2018, Doi: 10.2337/Dc17-0978.

[9] A. Suryoputro En E. Y. Fatmasari, "Faktor-Faktor Yang Berhubungan Dengan Pemanfaatan Posbindu Ptm Di Puskesmas Rowosari Kota Semarang", J. Kesehat. Masy., Vol 7, No 3, Bll 66–74, 2019, Doi: Https://Doi.Org/10.14710/Jkm.V7i3.25792.

[10] D. J. Den Hartogh, A. Gabriel, En E. Tsiani, "Antidiabetic Properties Of Curcumin I: Evidence From In Vitro Studies", Nutrients, Vol 12, No 1, Bl 118, Jan 2020, Doi: 10.3390/Nu12010118.

[11] A. Rahayu Prihartini, "Hubungan Peranan Posbindu Dengan Peningkatan Kesehatan Lansia Di

Desa Sindanghayu Kecamatan Beber Kabupaten Cirebon", J. Cahaya Mandalika Issn 2721-4796, Vol 1, No 1, Bll 1–12, Jul 2020, Doi: 10.36312/Jcm.V1i1.79.

[12] C. J. P. H. S. Team, "Central Java Health Service Strategic Plan For 2018-2023", 2019.

[13] V. Widyaningsih Et Al., "Missed Opportunities In Hypertension Risk Factors Screening In Indonesia: A Mixed-Methods Evaluation Of Integrated Health Post (Posbindu) Implementation", Bmj Open, Vol 12, No 2, Bll 1–11, 2022, Doi: 10.1136/Bmjopen-2021-051315.

[14] N. Misbah En A. Tansah, "Faktor-Faktor Yang Mempengaruhi Pemanfaatan Pos Pembinaan Terpadu Oleh Lansia", J. Med. (Media Inf. Kesehatan), Vol 2, No 2, Bll 133–149, Nov 2015, Doi: 10.36743/Medikes.V2i2.112.

[15] E. A. Bellei, D. Biduski, H. R. K. Lisboa, En A. C. B. De Marchi, "Development And Assessment Of A Mobile Health Application For Monitoring The Linkage Among Treatment Factors Of Type 1 Diabetes Mellitus", Telemed. E-Health, Vol 26, No 2, Bll 205–217, 2020, Doi: 10.1089/Tmj.2018.0329.

[16] Y. Sun Et Al., "Nonlinear Association Between Atherogenic Index Of Plasma And Type 2 Diabetes Mellitus In Overweight And Obesity Patients: Evidence From Chinese Medical Examination Data", Cardiovasc. Diabetol., Vol 23, No 1, Bl 226, 2024, Doi: Https://Doi.Org/10.1186/S12933-024-02330-Y.

[17] W. Jing Et Al., "Prevalence Of Comorbidities And Their Effects In Patients Infected With Sars-Cov-2: A Systematic Review And Meta-Analysis", Int. J. Infect. Dis., Vol 94, Bll 91–95, 2020.

[18] K. Farahbod, E. Slouha, A. Gerts, A. Rezazadah, L. A. Clunes, En T. F. Kollias, "The Effects Of Diet Intervention On The Gut Microbiota In Type 2 Diabetes Mellitus: A Systematic Review", Cureus, Vol 16, No 3, 2024, Doi: 10.1186/1471-230x-13-81.

[19] B. Draznin En Et Al., "Standards Of Medical Care In Diabetes—2022 Abridged For Primary Care Providers", Clin. Diabetes, Vol 40, No 1, Bll 10–38, 2020, Doi: 10.2337/Cd22-As01.

[20] D. J. Leander En D. L. Tahapary, "The Selection Of Oral Antidiabetic Drugs In Type 2 Diabetes Mellitus Patients With High Risk For Cardiovascular Events", J. Penyakit Dalam Indones., Vol 7, No 4, Bll 240–248, 2020.

[21] D. Sherifali, L. D. Berard, E. Gucciardi, B. Macdonald, En G. Macneill, "Self-Management Education And Support", Can. J. Diabetes, Vol 42, Bll S36–S41, 2018, Doi: 10.1016/J.Jcjd.2017.10.006.

[22] N. R. Nisa, M. Priatna, En Y. P. Sukmawan, "Drug Use Evaluation On Type 2 Diabetes Mellitus And Diabetic Nephropathy Inpatients In One Of Hospitals In Tasikmalaya", Indones. J. Clin. Pharmancy, Vol 7, No 4, Bll 243–251, 2018.

[23] J. P. Allegrante En Et Al., "[Reference Details Incomplete]", 2019.

[24] F. N. Admadja, Y. I. Wibowo, Karina K. Widjaja, En A. P. Setiadi, "A Narrative Review On Quality Of Prescribing In Elderly Patients With Diabetes Mellitus", J. Farm. Indones., Vol 20, No 1, Bll 64–75, 2023.

[25] S. Damayanti, Nursiswati, En T. Kurniawan, "Family Support Of Patients Type 2 Diabetes Mellitus In Performing Diabetes Self-Management", Padjadjaran Nurs. J., Vol 2, No 1, 2014.

[26] E. Wandira, S. Sarmalina, En M. R. Rulianti, "Hubungan Penggunaan Obat Simvastatin Dengan Kadar Gula Darah Penderita Diabetes Mellitus Di Rs Bhayangkara Palembang", Seljournal Penelit. Kesehat., Vol 8, No 1, Bll 1–13, 2020.

[27] U. D. Indrayani En K. D. Utami, "Deteksi Dini Penyakit Ginjal Kronis Pada Pasien Hipertensi Dan Diabetes Melitus Di Puskesmas Srondol", J. Abdimas-Ku J. Pengabdi. Masy. Kedokt., Vol

1, No 1, Bl 34, Jan 2022, Doi: 10.30659/Abdimasku.1.1.34-38.

[28] D. A. Mcallister Et Al., “Incidence Of Hospitalization For Heart Failure And Case-Fatality Among 3.25 Million People With And Without Diabetes Mellitus”, Circulation, Vol 138, No 24, Bll 2774–2786, 2018, Doi: 10.1161/Circulationaha.118.034986.

[29] F. Dwiyanti, “A 50-Year-Old Woman With Heart Failure With Type Ii Diabetes Mellitus And Hypertension As Risk Factors”, J. Medula, Vol 3, No 01, Bll 160–167, 2014.

[30] N. M. K. S. Tangkas, A. P. Putri, En M. M. Putra, “Pravelensi Diabetes Mellitus Pada Pasien Tuberculosis”, J. Penelit. Kesehatan" Suara Forikes"(Journal Heal. Res. Forikes Voice"), Vol 12, No 3, Bll 269–272, 2021, Doi: Http://Dx.Doi.Org/10.33846/Sf12310.

[31] S. A. Meo, A. A. Abukhalaf, A. A. Alomar, O. M. Alessa, O. Y. Sumaya, En A. S. Meo, “Prevalence Of Prediabetes And Type 2 Diabetes Mellitus In Football Players: A Novel Multi Football Clubs Cross Sectional Study”, Int. J. Environ. Res. Public Health, Vol 18, No 4, Bl 1763, 2021, Doi: 10.3390/Ijerph18041763.

[32] L. Siminerio, K. M. Ruppert, En R. A. Gabbay, “Who Can Provide Diabetes Self-Management Support In Primary Care?: Findings From A Randomized Controlled Trial”, Diabetes Educ., Vol 39, No 5, Bll 705–713, 2013, Doi: 10.1177/0145721713492570.

[33] Y. Y. Saifullah, M. Fujiko, S. D. Pramono, I. Lestari, En M. Hamsah, “Literature Review: Hubungan Diabetes Mellitus Gestasional Dengan Kelahiran Prematur”, Fakumi Med. J. J. Mhs. Kedokt., Vol 2, No 2, Bll 122–137, 2022.

[34] N. A. Kadoena, A. Rumi, En R. Hardani, “The Relationship Between The Compliance Level Of Prolanis Diabetes Mellitus Patients And The Quality Of Life During The Covid-19 Pandemic In Primary Health Facilities In Palu City”, Idea Syntax, Vol 4, No 3, Bll 1–13, 2022.

[35] D. Tripathi Et Al., “Il-22 Produced By Type 3 Innate Lymphoid Cells (Ilc3s) Reduces The Mortality Of Type 2 Diabetes Mellitus (T2dm) Mice Infected With Mycobacterium Tuberculosis”, Plos Pathog., Vol 15, No 12, Bl E1008140, 2019, Doi: Https://Doi.Org/10.1371/Journal.Ppat.1009578.

[36] L. R. Armstrong, J. S. Kammerer, En M. B. Haddad, “Diabetes Mellitus Among Adults With Tuberculosis In The Usa, 2010–2017”, Bmj Open Diabetes Res. Care, Vol 8, No 1, Bl E001275, 2020, Doi: Http://Dx.Doi.Org/10.1136/Bmjdrc-2020-001275.

[37] I. M. Of Health, “Technical Instructions For The Integrated Development Post For Non-Communicable Diseases (Posbindu Ptm)”, 2012. [Online]. Available At: Http://P2ptm.Kemkes.Go.Id/Uploads/2016/10/Petunjuk-Teknis-Pos-Pembinaan-Terpadu-Penyakit-Tidak-Menular-Posbindu-Ptm-2013.Pdf.

[38] H. Agustin Et Al., “Analysis Of Cd4 And Cd8 Expression In Multidrug-Resistant Tuberculosis Infection With Diabetes Mellitus: An Experimental Study In Mice”, Ann. Med. Surg., Vol 68, Bl 102596, 2021, Doi: Https://Doi.Org/10.1016/J.Amsu.2021.102596.

[39] R. K. Radhakrishnan Et Al., “Bcg Vaccination Reduces The Mortality Of Mycobacterium Tuberculosis–Infected Type 2 Diabetes Mellitus Mice”, Jci Insight, Vol 5, No 5, 2020, Doi: Https://Doi.Org/10.1172%2fjci.Insight.133788.

[40] L. Legiawati, K. Bramono, W. Indriatmi, E. Yunir, En A. I. Pratama, “Type 2 Diabetes Mellitus With Early Dry Skin Disorder: A Comparison Study Between Primary And Tertiary Care In Indonesia”, Curr. Diabetes Rev., Vol 18, No 2, Bll 89–97, 2022.

[41] H. S. Putri, “Etlingera Elatior Sebagai Antihperglikemi Pada Penderita Diabetes Mellitus”, J. Penelit. Perawat Prof., Vol 3, No 1, Bll 189–198, 2021, Doi: 10.37287/Jppp.V3i1.386.

[42] E. Jeon En H. A. Park, “Experiences Of Patients With A Diabetes Self-Care App Developed

Based On The Information-Motivation-Behavioral Skills Model: Before-And-After Study", Jmir Diabetes, Vol 4, No 2, Bll 1–11, 2019, Doi: 10.2196/11590.

[43] R. S. Siregar, R. A. Hadiguna, I. Kamil, N. Nazir, En N. Nofialdi, "Ginger (Zingiber Officinale R.) As A Potent Medicinal Plant For The Prevention And Treatment Of Diabetes Mellitus: A Review.", Trop. J. Nat. Prod. Res., Vol 6, No 4, 2022.

[44] T. Sepriani, "Hubungan Faktor Lingkungan Fisik Dengan Kualitas Hidup Penderita Diabetes Mellitus", Comserva J. Penelit. Dan Pengabdi. Masy., Vol 2, No 07, Bll 1097–1108, 2022, Doi: Https://Doi.Org/10.36418/Comserva.V2i07.421.

[45] D. Nurmansyah, E. Stasya, D. Ramadhani, N. Normaidah, En A. Astuti, "Hyperglicemia As Predisposition Factor Of Oral Candidiasis On Patient With Diabetes Mellitus", Biomedika, Vol 13, No 1, Bll 46–50, Jul 2020, Doi: 10.31001/Biomedika.V13i1.703.

[46] E. C. Kieffer Et Al., "Reducing Disparities In Diabetes Among African-American And Latino Residents Of Detroit: The Essential Role Of Community Planning Focus Groups", Ethn. Dis., Vol 14, Bll S1-27-S1-37, 2004.