

## Improving the Family Caregiver's Knowledge about Diet Diabetes Management through WhatsApp online Health Educations

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### ABSTRAK

Informasi tentang manajemen diet diabetes mellitus tipe 2 (T2DM) sangat penting untuk pengasuh keluarga yang merawat lansia dengan T2DM. Pengasuh keluarga harus memiliki pengetahuan yang baik tentang cara mengelola diet untuk lansia dengan T2DM. Tujuan dari penelitian ini adalah untuk menguji efek dari pendidikan kesehatan online tentang manajemen diet diabetes melalui media WhatsApp terhadap pengetahuan pengasuh keluarga di Puskesmas Rantang, Medan. Desain penelitian ini adalah *quasy-experimental with pretest dan posttest only design*. Sample yang memenuhi kriteria sebanyak dua puluh dua pengasuh keluarga yang merawat lansia dengan T2DM di rumah diseleksi dengan menggunakan teknik *purposive sampling*. Pendidikan kesehatan online tentang manajemen diet diabetes pada lansia dengan T2DM melalui WhatsApp diberikan ke pengasuh keluarga selama empat minggu. Pengetahuan pengasuh keluarga diukur dengan Knowledge Diabetes Diet Questionnaires (KDDQ). Hasil penelitian ini menemukan bahwa skor rata-rata pengetahuan sebelum diberikan pendidikan kesehatan online adalah 11,95, dan setelah menerima pendidikan kesehatan online, skor rata-rata pengetahuan adalah 18,18. Hasil test Wilcoxon menunjukkan bahwa ada perbedaan dalam skor rata-rata pengetahuan sebelum dan sesudah menerima pendidikan kesehatan online melalui WhatsApp ( $p < 0,05$ ). Pengetahuan pengasuh keluarga meningkat 6,23 poin melalui pendidikan online WhatsApp. Dapat disimpulkan bahwa menggunakan media WhatsApp untuk edukasi kesehatan terbukti dapat meningkatkan pengetahuan pengasuh keluarga tentang management diet DM. WhatsApp dapat digunakan oleh petugas kesehatan sebagai salah satu media edukasi kesehatan.

**Kata Kunci** : diet diabetes; lansia; diabetes mellitus tipe 2; WhatsApp

### ABSTRACT

Information about diet management of Type 2 Diabetes Mellitus (T2DM) is very important for family caregivers caring for elderly with T2DM. Family caregivers should have a good knowledge of how to manage dietary restriction for elderly with T2DM. The purpose of the study was to determine the effect of the online health education about diet diabetes management through WhatsApp media on family caregiver's knowledge at Rantang Public Health Center (PHC), Medan. The research design used in this study was a *quasi-experimental study pretest and posttest only one group*. The samples were twenty-two family caregivers caring for elderly with T2DM at home and were selected using a *purposive sampling*. Online Health Education about diet diabetes management of elderly with T2DM through WhatsApp was delivered to family caregiver for four weeks. Family caregiver's knowledge was measured by Knowledge of Diabetic Diet Questionnaire (KDDQ-I). The results of this study found that the mean score of knowledge before receiving the online health education was 11.95, and after receiving the online health education the mean score of knowledge was 18.18. The Wilcoxon test found a difference in mean score of knowledge before and after receiving online health education through WhatsApp ( $P < 0.05$ ). The family caregiver's knowledge was increasing 6.23 points through WhatsApp online education. It can be concluded that using WhatsApp media for health education is proven to increase family caregivers' knowledge about DM dietary management. WhatsApp can be used by health workers as a media for health education.

**Keyword**: diet diabetes, elderly, type 2 diabetes mellitus, WhatsApp

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## I. INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is very common in elderly people.<sup>1,2,3</sup> Due to aging, older people with T2DM experienced a loss of independent<sup>4</sup> and cognitive impairment<sup>5</sup>, it can lead to increase their dependent up to their

family.<sup>6,7</sup> Diabetes mellitus is incurable disease that require critical attention, elderly people with T2DM need support from family members as a caregivers in order to carry out their activities that are useful in controlling their blood sugar levels<sup>8</sup>. Therefore, the family caregivers play an

important role in providing long-term care for elderly with T2DM.

One of the most important the management of diabetes disease is diet management.<sup>1, 9,10</sup> Diet is the main therapy in T2DM, every patient including family caregivers should follow the right diet to avoid the diabetes complication both acute and chronic.<sup>11</sup> Family caregiver should have the good knowledge how to manage the dietary restriction.<sup>12,1</sup> International Diabetes Federation revealed that self-management education should be provided to caregivers<sup>12</sup>, because the implementation and planning of a diabetes diet is strongly influences by the support from family caregivers.<sup>13</sup> Family's knowledge about diet is a tool that can help patients with diabetes in managing diet for their long life.<sup>14</sup> With a good diet management, blood sugar levels will be controlled and the patient's quality of life will be increased.<sup>10</sup>

Several studies in Indonesia have been reported that family's knowledge about diet of T2DM significant influence the blood sugar of the patient.<sup>14 - 15</sup> A study by Yusnita and Lestari,<sup>14</sup> on 75 family caregivers of elderly with diabetes residing at Pringsewu Public Health Center found that 61.3% poor of family's knowledge about diet management, and 89.1% have uncontrolled blood glucose of their recipient. Furthermore, family caregivers who have poor knowledge about diet of diabetes will be at risk of 15 times having abnormal blood sugar levels in elderly diabetic patients who are cared for by the family caregiver.<sup>14</sup> Also, the families with high level of education about diet management was influencing the elderly patient's adherence of diet as 96.3%.<sup>15</sup> Although the several studies have been reported that knowledge of family caregiver about diet management have significant influence the blood sugar diabetes patients, however, studies have been found that the most of family member or family caregivers have poor of knowledge about diet management of diabetes.<sup>14-16</sup>

Study conducted by Nugraheni, on 48 families residing at Kasihan I Bantul Community Health Center found that most of the family's knowledge was in low category.<sup>16</sup> A similar study conducted by Handayani et al., in Purwokerto

found that most of the family caregiver's knowledge about diet was low (64.3%).<sup>17</sup> Therefore, the information about diet management for elderly with diabetes is very important. Pasaribu suggests to healthcare provider at Pancur Batu Public Health Center, North Sumatra to provide health education about diet management for families who have elderly patients with T2DM.<sup>15</sup> However, with recent advances in information and technology, this is a challenge for community nurses to provide health education.

Indonesian people are more likely to choose WhatsApp in a mobile phone as a communication media compared to other chat media.<sup>18</sup> The use of WhatsApp program is very effective with support of its features compared to other instant messaging applications.<sup>19</sup> The speed of messages without a long-time delay, able to operate in weak signal conditions, large capacity for sending text, voice, photo, and video data, without advertising interference, and the nature of its distribution, makes WhatsApp one of the alternative media in providing information and improving performance.<sup>20</sup>

A study conducting by Handayani & Milie, on 41 pregnant women found that the knowledge of pregnancy women about early detection of preeclampsia was increase after receiving health education by WhatsApp media.<sup>21</sup> Study about health education using WhatsApp media about diabetes diet management on elderly knowledge at Kute Panang found that diabetes diet management knowledge was significant increase.<sup>22</sup> Similar with a study conducted by Marbun et al., found that the education through WhatsApp could improve self-efficacy of the elderly to manage their diabetes.<sup>23</sup> To our knowledge the effect of health education about diet diabetes management via WhatsApp on knowledge of family caregivers caring for T2DM has not been found yet. Regarding to the new normal of coronavirus disease 2019 (Covid-19) pandemic era, most people have used the mobile phone to communicate to each other. It is a challenge to community nurses to provide health education face-to-face, because most people interested in mobile phone contain.<sup>24</sup> Nurses should be able to provide health promotion to

individuals, families, and communities through technology based on the internet such as WhatsApp.<sup>24</sup> Therefore, this study's purpose was to determine the family caregiver's knowledge about diet diabetes management of elderly with T2DM before and after receiving health education through WhatsApp. This study will contribute to the nurse working with family caregivers to care for elderly with T2DM at home in improving the quality of care.

## II. METHODS

Quasi-experimental study was used with pre and posttest only one group design. This study was conducted in the Rantang Public Health Center working area, Medan North Sumatera. This study was selected by purposive sampling technique with inclusion criteria: 1) family member (spouse, children, grandchildren) taking care for elderly with T2DM at home, 2) have an android mobile phone connect with the internet, 3) able to operationalize the WhatsApp, 4) can read and speak Bahasa Indonesia, 5) aged between 18 years and over. For recipient criteria: 1) having been diagnosed with T2DM by doctor at Rantang PHC, 2) aged 60 years and over. The sample size was calculated based on Cohen's table, with the Power at 0.80, effect size at 1.00, Alpha at 0.05 yielded 17 family caregivers. To estimate the sample dropout, the researcher added 5 family caregivers (3%).<sup>22</sup> The total sample in this study were 22 family caregivers.

Knowledge of Diabetic Diet Questionnaire (KDDQ-I) Indonesian version was used to measure the family caregiver's knowledge about diet management of diabetes mellitus.<sup>25</sup> The KDDQ-I measures including knowledge about diet management: calorie count, healthy eating, meal scheduling or meal planning. The validity and reliability have been tested with Cronbach Alpha at 0.950<sup>26</sup> The KDDQ-I consist of 10 items with three point Likert scale (0 = Unknown/UK, 1= False/F, 2= True/T). Total range scores 0 to 20. The higher score indicated a higher knowledge about diabetes diet management.<sup>25</sup>

Health education program about Diet Management was carried out based on theory of Diet Diabetes Management for T2DM developed

by Ministry of Health Republic of Indonesia consist of four session and four topics. The topic consists of 1) brief information about diabetes type 2 diabetes mellitus in elderly (definition, etiology/symptom, goals of diabetes diet), 2) type of food recommended for type 2 diabetes, 3) diet calorie count, 4) mealtime. Each topic is 60-minutes, each session was held one time per week for four weeks.

The first session includes the introduction of Type 2 diet diabetes definition, the goals of diet diabetes. The second session included the type of food recommended for type 2 diabetes. The third session includes the number of calories. The fourth session includes mealtimes. The educational program activities include group discussion, giving questions and answers, use of educational video, images, and PowerPoint. All the topics were performed by WhatsApp media.

In the WhatsApp group, the participant could participate in giving questions, discussion, and learn from educational videos, images, and PowerPoint. Before implementing the intervention, the researchers were measuring the knowledge of family caregivers. The intervention was conducted in October to November 2022. After four weeks intervention, the researcher was measuring the second time of family caregiver's knowledge by questionnaire through google form.

All participants were ensured the signature in the informed consent form. Ethical committee approval was obtained from Sari Mutiara Indonesia University with number of certificate: 471/F/KEP/USM/V/2022.

The data was analysis by performing SPSS 22 version. Wilcoxon test with Alpha at 0.05 was used to test the effect of intervention.

## III. RESULT AND DISCUSSION

A total family caregivers completed this study were 22 participants. The majority of participant were female (72.7%), aged between 36-45 years (40.9%) and 40.9% were senior high school of education level (table 1). The characteristic of elderly with T2DM were female (54.5%), most recipients were aged between 66 to 70 years (36.4%).

Table 1. The characteristics of family caregivers and elderly with T2DM at Rantang PHC.

Characteristics	Family caregivers		Elderly with T2DM	
	n	%	n	%
Gender:				
Male	6	27.3	10	45.5
Female	16	72.7	12	54.5
Age (year):				
18-25	2	9.09		
26-35	5	22.7		
36-45	9	40.9		
46-55	6	27.2		
Age (year):				
61-65			6	27.3
66-70			8	36.4
71-80			4	18.2
76-80			4	18.2
Level of education:				
Elementary school	4	18.18		
Junior High School	7	31.81		
Senior High School	9	40.90		
University	2	9.09		

Table 2. Family Caregiver's knowledge about diet diabetes management using Wilcoxon test.

	Knowledge about diet management		Z	P-value
	M	SD		
Pre-intervention	11.95	2.058	-4.116	0.000
Post-intervention	18.18	1.593		

Table 2 has shown that mean scores of Family Caregiver's knowledge pre-intervention were 11.95 (SD = 2.058), while post-intervention was 18.18 (SD = 1.593). These results showed that the knowledge about diet diabetes management of family caregivers has increased

6.23 points after participating in the health education program by WhatsApp. The result of Wilcoxon *-test* has shown significant difference score of family caregiver's knowledge about diet management of diabetes pre-test and post-test intervention ( $Z = -4.116, p < .05$ ).

This study, the mean score of Family Caregiver's knowledge was low (11.95) before receiving the health education through WhatsApp. Family caregivers did know how to provide the meals for elderly, select the healthy foods for elderly, the type of food that is high in sugar levels such as compote, cake, bread, pudding jam, drink juice with sugar. Also, they did not know the mealtime. In addition, did not know the management of food in the elderly such as food baked goods, they unknown that boiled or steamed is better food consumed by the elderly than fried food. Whereas, after receiving the health education about diet management for elderly with T2DM through media of WhatsApp, the participant's knowledge about diet management has increased 6.23 points.

Health education through WhatsApp could increase the Family Caregiver's knowledge about diet diabetes management for elderly with T2DM. Providing information through WhatsApp can help caregivers of elderly and families to gain knowledge information easily at home. Family caregivers can easily remember how to manage the diet of elderly with T2DM through opening their mobile phone. This health education method also provides flexibility for families to access the lesson, provides opportunities for family to learn independently and provide relatively more efficiency.<sup>18</sup> This online learning method also makes it easier for nurses to provide education without having to meet directly with respondents. It is more efficient used for communication anywhere, anytime, and low cost.<sup>24</sup> Rusni & Lubis,<sup>27</sup> and Afnihar & Fajhriani,<sup>19</sup> states that online education has benefits for teachers and learners, because it can communicate easily without being limited by distance, time and place. This finding was similar to study conducted by Handayani & Milie,<sup>21</sup> found that the knowledge of pregnant women in early detection of preeclampsia during the Covid-19 pandemic at Simo Hospital was significant

increase after received the health education by using WhatsApp media.

WhatsApp media is easier than other online media applications used for communications.<sup>20</sup> WhatsApp is one of the social media that is included in the chat/messenger category which makes it easier for users to send messages or information personally or in a group with various other features that are easier to use by various groups in terms of age such as from young to old<sup>18</sup>. A study conducted by Afnibar<sup>19</sup> found that most of students 73.60% felt that it were easier for them to communicate and support learning activities compared to other media. Similar to other studies found more than 70% of students states that the application of WhatsApp had a positive impact on their learning activities and supported the improvement of their communication with lecturers.<sup>19, 20</sup> WhatsApp media is very effective with support of its features compared to other instant messaging applications.<sup>19</sup> The speed of messages without a long-time delay, able to operate in weak signal conditions, large capacity for sending text, voice, photo, and video data, without advertising interference, and the nature of its distribution, makes WhatsApp one of the alternative media in providing information and improving performance.<sup>20</sup>

Some limitations of this study included conducted with one group, it is better result if for the next future research use with control group design and use the randomized control trial method. The factors influencing the knowledge were not controlled in this study, it could affect the results of this study. Participant was recruited from one PHC in Medan, it cannot generalize for the family caregiver in other setting in Indonesia. However, this study has an effect to increase the Family Caregiver's knowledge about diet diabetes management that is very important to manage diabetes disease.

## V. CONCLUSION AND RECOMMENDATION

The intervention of health education through WhatsApp media was significant increase the family caregiver's knowledge about diet diabetes management for elderly with type 2 diabetes mellitus at Rantang PHC, Medan.

Nurses in the community can use the WhatsApp media when providing health education for family caregivers caring for elderly with T2DM at home in new normal Covid -19 pandemic era.

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## REFERENCE

1. Chen WC, Lee CC, Chien MN, Liu SC, Wang CH, Yang WS. Blood Glucose Management of Type 2 Diabetes in the Older People. *Int J Gerontol* [Internet]. 2018;12(3):170–4. Available from: <https://doi.org/10.1016/j.ijge.2018.05.008>
2. Longo M, Bellastella G, Maiorino MI, Meier JJ, Esposito K, Giugliano D. Diabetes and aging: From treatment goals to pharmacologic therapy. *Front Endocrinol (Lausanne)*. 2019;10(FEB).
3. Saha MM, Sarkar G, Dutta M, Mukherjee S, Biswas K, Das T. An Overview of Diabetes Mellitus in elderly population an overview of Diabetes Mellitus in elderly population. 2019;(February). Available from: [https://www.researchgate.net/publication/331328156\\_An\\_Overview\\_of\\_Diabetes\\_Mellitus\\_in\\_Elderly\\_Population](https://www.researchgate.net/publication/331328156_An_Overview_of_Diabetes_Mellitus_in_Elderly_Population)
4. Bigelow A, Freeland B. Type 2 Diabetes Care in the Elderly. *J Nurse Pract* [Internet]. 2017;13(3):181–6. Available from: <http://dx.doi.org/10.1016/j.nurpra.2016.08.010>
5. Sun L, Diao X, Gang X, Lv Y, Zhao X, Yang S, et al. Risk Factors for Cognitive Impairment in Patients with Type 2 Diabetes. *J Diabetes Res*. 2020;2020.
6. Rondhianto R, Nursalam N, Kusnanto K, Melaniani S, Ahsan A. Analysis of the Sociodemographic and Psychological Factors of the Family Caregivers' Self-Management Capabilities for Type 2 Diabetes Mellitus. *J Ners*. 2019;14(2):215–23.
7. Badriah S, Wiarsih W, Permatasari H. Pengalaman Keluarga dalam Merawat Lanjut Usia dengan Diabetes Mellitus. *J Keperawatan Indones*. 2017;17(2):57–64.
8. Hill J. The older person with diabetes: Considerations for care. *Br J Community Nurs*. 2019;24(4):160–4.
9. Sesti G, Antonelli Incalzi R, Bonora E, Consoli A, Giaccari A, Maggi S, et al. Management of diabetes in older adults. *Nutr Metab Cardiovasc Dis* [Internet]. 2018;28(3):206–18. Available from: <https://doi.org/10.1016/j.numecd.2017.11.007>
10. Kurnia AD, Amatayakul A, Karuncharernpanit S.

- Predictors of diabetes self-management among type 2 diabetics in Indonesia: Application theory of the health promotion model. *Int J Nurs Sci* [Internet]. 2017;4(3):260–5. Available from: <http://dx.doi.org/10.1016/j.ijnss.2017.06.010>
11. Arfina A. Pengaruh Edukasi Pengaturan Diet Terhadap Perilaku Pengelolaan Diet Pada Penderita Diabetes Melitus Di Kelurahan Agrowisata Kecamatan Rumbai Kota Pekanbaru. *Indones Trust Heal J*. 2019;2(2):246–51.
  12. Dunning T, Sinclair A. The IDF global guideline for managing older people with type 2 diabetes: Implications for nurses. Vol. 18, *Journal of Diabetes Nursing*. 2014. 145–150 p.
  13. Baroroh DB, Irafayani N. Peran Keluarga Sebagai Care Giver Terhadap Pengelolaan Aktifitas Pada Lansia Dengan Pendekatan NIC (Nursing Intervention Classification) Dan NOC (Nursing Outcome Classification). *J Keperawatan*. 2015;3(2):141–51.
  14. Yusnita Y, Lestari A. Hubungan Pengetahuan Keluarga Tentang Diet Diabetes Mellitus Dengan Kadar Gula Darah Pasien. *J Wacana Kesehat*. 2020;4(2):480.
  15. Pasaribu NS. Gambaran Pengetahuan Keluarga tentang pemberian Diet pada Penderita DM di Puskesmas Pancur Batu. *Poltekkes kemenkes Medan* [Internet]. 2019;1–13. Available from: <http://poltekkes.aplikasi-akademik.com/xmlui/handle/123456789/2148>
  16. Nugraheni AA. Gambaran Tingkat Pengetahuan Keluarga tentang Diet Pasien Diabetes Mellitus di Wilayah Kerja Puskesmas Kasihan I Bantul. *Skripsi* [Internet]. 2017; Available from: <http://repository.umy.ac.id/bitstream/handle>
  17. Handayani H, Nuravianda Y, Haryantoi I. Hubungan Tingkat Pengetahuan dan Dukungan Keluarga terhadap Kepatuhan Diet Pasien Diabetes Mellitus Di Klinik Bhati Husada Purwakarta. *J Holist Heal Sci*. 2017;1(1):50–62.
  18. Rahartri. “Whatsapp” Media Komunikasi Efektif Masa Kini (Studi Kasus Pada Layanan Jasa Informasi Ilmiah di Kawasan Puspiptek). *Visi Pustaka*. 2019;21(2):147–56.
  19. Afnibar, Fajhriani D. Pemanfaatan WhatsApp sebagai Media Komunikasi Kegiatan Belajar ( Studi terhadap Mahasiswa UIN Imam Bonjol Padang ). *Al-Munir J Komun dan Penyiaran Islam* [Internet]. 2020;11:70–83. Available from: <https://ejournal.uinib.ac.id/jurnal/index.php/almunir/article/download/1501/1122>
  20. Zakirman, Rahayu C. Popularitas WhatsApp Sebagai Media Komunikasi dan Berbagi Informasi Akademik Mahasiswa. *Shaut al-Maktabah J Perpustakaan, Arsip dan Dokumentasi* [Internet]. 2018;10(1):27–38. Available from: <https://rjfahuinib.org/ejournal/index.php/shaut%0Ahttps://rjfahuinib.org/index.php/shaut/article/view/7/6>
  21. Handayani S, Milie P. The Influence Of Health Education Through Whatsapp Groups On The Knowledge And Attitudes Of Pregnant Woment In Early Detection Of Preeclamsia During The Covid 19 Pandemic. *J Kebidanan*. 2020;XII(02):217–30.
  22. Sijabat F, Siregar R, Sitanggung A. Pengaruh Edukasi Dengan Metode Whatsapp Terhadap Pengetahuan Lansia. *J Keperawatan Widya Gantari Indones*. 2022;6(3):203.
  23. Marbun AS, Siregar R, Harefa K, Sinabutar TYF. Pengaruh Diabetes Self Management Education (Dsme) Berbasis Aplikasi Whatsapp Terhadap Self Efficacy Pada Pasien Dm Tipe 2 Di Puskesmas Hamparan Perak. *J Mutiara Ners*. 2021;4(2):128–39.
  24. Putri SE, Sukihananto S. Penerapan Sistem Teknologi Informasi dan Komunikasi (TIK) dalam Promosi Kesehatan pada Lansia di Indonesia. *Wawasan Kesehat*. 2018;3(2):71–7.
  25. Sundari PM. Hubungan tingkat pengetahuan dan self management diabetes dengan tingkat stres menjalani diet penderita diabetes mellitus. Vol. 53, *Journal of Chemical Information and Modeling*. 2018. 1689–1699 p.
  26. Kusnanto K, Sundari PM, Asmoro CP, Arifin H. HUBUNGAN TINGKAT PENGETAHUAN DAN DIABETES SELF-MANAGEMENT DENGAN TINGKAT STRES PASIEN Pendahuluan Metode. 2019;22(1):31–42.
  27. Rusni A, Lubis EE. Penggunaan media online WhatsApp dalam aktivitas komunitas one day one juz (ODOJ) dalam meningkatkan minat tilawah ODOJER di kota Pekan Baru. *Jom Fisip*. 2017;2(1):1–15.