



Using The Booklets "Raka" (Rawat Kaki) In Preventing Diabetic Neuropati In Mataram City

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Abstract

One complication of Diabetes Mellitus (DM) is diabetic neuropathy and requires ongoing treatment with a Strategy to reduce the risk of complications. Efforts to prevent one of them by doing regular diabetic foot care. Foot care is considered easy and can be done by the patient independently, but has not been fully carried out by the patient. The purpose of this research is to determine the use of a book in the prevention of diabetic neuropathy in the city of Mataram. This research used a quasi-experiment with a pre-test design post-test group design with a control group. The group was divided into two treatment groups of 30 respondents and the control of 30 respondents was divided by drawing and used purposive sampling. Data collected were foot care behavior using the NAFF questionnaire, foot sensation using monofilament, and foot circulation using an ankle-brachial index. Statistical analysis uses paired T-Test, Independent T-Test, Wilcoxon Sign Rank Test, and Mann Whitney Test. The results obtained have a significant effect on the use of Booklet Raka in preventing diabetic neuropathy in the treatment group by carrying out treatment behavior with $p = 0,000$ while the control group $p = 0.091$. Significant increase in circulation only in the treatment group with a value of $p = 000$ the control group $p = 0.863$. Foot sensation increased significantly only in the treatment group with a value of $p = 0.001$ the control group $p = 0.445$. it can be concluded that the use of Booklet Raka is influential and effective in preventing diabetic neuropathy by carrying out foot care behavior, foot circulation, and sensation in diabetics.

Keywords: Booklet;Diabetic;Neuropathy

INTRODUCTION

Diabetes (DM) is a complex chronic disease that requires continuous treatment through a multi-factor risk reduction strategy, in addition to controlling blood sugar levels (American Diabetes Association, 2017). Because the treatment is very complicated, if not handled properly, it can cause complications. One complication of diabetes is neuropathy or DPN, which is the most common disease and will worsen the quality of life of patients because it can attack various nerves (Tabatabaei-Malazy et al., 2011). Besides, diabetic neuropathy is very dangerous because it can cause a variety of problems, including increased heart frequency, foot ulcers, sexual dysfunction, and other

neurological diseases, including diabetic retinopathy. (Smeltzer, S.C. dan Bare, 2013).

According to data from the International Diabetes Federation (IDF), there were 382 million in 2013, which will increase to 592 million by 2035. Most are aged between 40 and 59 years, 80% of whom live in low and middle-income countries, while Indonesia ranked seventh as the country with the largest diabetes sufferers in the world 8.5 million. Based on Riskesdas, (2018) there was an increase in DM presidency according to the consensus of the Perkeni 2011 in 2013 the prevalence of 6.9% increased in 2018 to 8.5% while the consensus of the arts in 2015 in 2018 became 10.9%. This increased

prevalence of DM certainly has a risk of increasing the occurrence of peripheral neuropathy. Kuate-Tegueu et al., (2015), say nearly 50% of patients with DM experience neuropathic complications. Christia, Yuwono, & Fakhurrasy (2015) explained that neuropathy plays a very important role in the development of diabetic ulcers, ie ulcers rarely occur when there is no neuropathy. This is a consultant with the results of Agbaor et.al. it was found that more than 80% of diabetic ulcers were related to neuropathy. Besides that being one of the factors that most often cause amputation of extremities 15-45 times more often than people who do not suffer from DM.

The prevalence of DM in West Nusa Tenggara (NTB) shifts the 10 most diseases in the NTB health center, from 2016 DM disease is not included in the top 10 but in 2017 DM disease is included in the 10 most diseases (Dinas Kesehatan NTB, 2017). In the city of Mataram, specifically in Tanjung Karang Health Center, the number of DM sufferers was 211 patients, second only to the Cakra Negara Health Center with 334 patients (DinKes Kota & Mataram, 2015).

Efforts to prevent diabetic foot is by doing foot care that can be done regularly (Adhiarta, 2011). Regular foot care is considered easy and can be done independently by the patient. However, many foot treatments are not carried out as expected. Based on preliminary research that researchers did at the study site of 10 sufferers, ordinary sufferers did not take care of their feet properly, for example, they cut the right nails, used appropriate shoes, feet looked dry, and 7 people complained of tingling. To improve the ability of people with DM in performing foot care can use learning media in conducting education. Gerlach (in Wina Sanjaya, 2006) confirms knowledge, attitudes, and skills obtained from a condition of support from people, materials, and equipment. Rusman, Deni Kurniawan, (2012) also revealed that compared with

students who use media it is easier to understand and remember over a long time. The booklet is one of the media in delivering health information in the form of writing and pictures as well (Wanodya Puspitaningrum, Farid Agushybana, Atik Mawarni, 2017). Gemilang, (2016) also explained Booklet is a print media in the form of a book containing information that will be delivered by the booklet maker. Media booklets have been identified in the study of Murdiyanti et al.,(2017), booklets can improve DM patient compliance in the management of therapeutic regimens (Srikartika, V. M., Akbar, M. R., & Lingga, 2019), also emphasized in their research, stating that the booklet about DM also increases the knowledge and compliance of DM patients.

Considering the importance of the booklet media, the researchers created a RAKA (Foot Care) booklet in supporting education on health issues regarding foot care, to make efforts to prevent diabetic neuropathy. Therefore, researchers want to examine the use of the RAKA booklet in preventing diabetic neuropathy in the city of Mataram.

The purpose of this study was to determine the effect of the use of the RAKA Booklet in preventing Diabetic Neuropathy in Mataram City.

METHOD

This study was approved by the University of Mataram Health Research Ethics Commission number: 277 / UN18.F7 / ETIK / 2019 and implemented in 2019

The research design used in this research is a quasi-experimental (quasi-experiment) which is carried out using two groups (treatment group and control group). A total of 60 people were recruited as respondents from DM patients, those who sought treatment at the Tanjung Karang Health Center, Cakra Health Center, and Karang Taliwang Health Center. After that, divided randomly into two groups using a

coin lottery, one group consisting of 30 respondents in the treatment group and 30 respondents in the control group.

Instruments used for foot care behaviors were collected before and after intervention using the NAFF questionnaire (Lincoln et al., 2007), which was developed and translated into Indonesian by Kurniawan Titis, et al, (2013) and adapted to the Indonesian culture. The number of question items is 27 questions, and the Likert scale used is 0-3. The higher the score, the better the DM foot care behavior. Whereas data on foot sensation were collected using a checklist with monofilament examination and peripheral blood circulation in the legs was collected using a checklist with blood pressure checks before and after the intervention was given.

The first way of working is to use the interview method based on a foot care questionnaire to pre-test the treatment group and the control group. Then proceed to assess the sensation on both feet of the respondent using monofilament and also measure the Ankle Brachial Index (ABI). The details are as follows:

The intervention group got an education program using the Raka Booklet which consisted of foot care and foot exercises for 5 weeks, every week there were 2 meetings.

- 1) The week I, using the Raka Booklet for education, which includes foot care, including foot complications, how to clean feet, nail care, selection of footwear and foot exercises
- 2) Week II, III, and IV researchers identified foot care as well as observed foot hygiene, nail care, footwear selection and sensation in the feet and ABI
- 3) Week V, use the same equipment as the pretest to do the post-test

For the control group, they received routine interventions given by health workers at the Prolanis

meeting and at the time of the control to the health center and also conducted a post-test at week V.

For data from the results of the study were analyzed in two ways: first, univariate analysis was used to describe each variable measured in the form of a frequency distribution. Both bivariates analyze, using the Paired t-Test and Independent t-test if the data are normally distributed, if not normally distributed using the Wilcoxon sign Rank Test and Mann Whitney test.

RESULT AND DISCUSSION

The RAKA booklet in the prevention of diabetic neuropathy in the city of Mataram, both in the training and control groups, the following data will be presented: the data are presented as follows:

Table 1 Differences in Average Behavior of Foot Care Before and After Intervention in the Control Group in Mataram City in 2019

No	Foot Care	Before		After		Nilai	
		Mean	SD	Mean	SD	t	p
1	Intervention Group	35,00	8,030	61,07	4,913	18,093	0,000
2	Control Group	35,23	6,361	37,40	6,289	1,751	0,091

Following the results of the study in table 1 shows that the use of booklet effects in preventing diabetic neuropathy by carrying out foot care significantly increases the behavior of foot care in preventing the occurrence of diabetic neuropathy in the treatment group 35.00 to 61.07 = 26.07 significantly higher p = 0,000 compared to the control group the average difference in value from 35.23 to 37.40 = 2.17, p = 0.091

Table 2: Differences in Average Behavior of Foot Care After Intervention in the Treatment and Control Groups in Mataram City in 2019

No	Foot Care	n	Mean	SD	Value	
					t	p
1	Intervention Group	30	61,07	4,913	17,958	0,000
2	Control Group	30	37,40	6,289		

Following the results in table 2 shows that the results of the independent t-test prove that the intervention given to the treatment group is more effective than the control group $p = 0,000$.

The Raka Booklet used in this study can improve foot care behavior because the Raka Booklet includes foot care and foot exercises. Levie & Lentz (in Sanaky, 2013) explains some of the functions of the booklet, namely: can direct attention to the content of the material because it contains the pictorial text. The second can improve cognitive function, accelerate understanding, and remember information or messages contained in images. This is also confirmed by Sudiharto (2007) in (Windani et al., 2016), informative and interesting educational material, which is a supporting factor in providing education. An interesting foot care booklet will increase understanding and stimulate patient enthusiasm after exposure to the material. Previous research has explained that using media during health education can effectively improve knowledge and behavior in the short term (5 weeks) (Sae-Sia et al., 2013) and long term (6 months) (Vatankhah et al., 2009 in Windani et al., 2016). The booklet allows respondents to reread and find more information related to the material provided. The health education plan using the Raka Booklet in this study also included home visits twice a week for 5 weeks. Besides that, the researcher also intervened in respondents in the form of motivation to carry out expected foot care. Providing regular foot care visits increases motivation so that turn respondents can help improve their knowledge, responsibilities, skills, and motivation to improve treatment of foot care behavior (Bodenheimer et al., 2007) in (Windani et al., 2016).

Table 3 Differences in foot circulation before and after intervention in the treatment and control groups in the city of Mataram in 2019

No	Foot Circulation	n	Before		After		p
			Mean	SD	Mean	SD	
1	Intervention Group	30	1,02	0,13	1,10	0,14	0,000
2	Control Group	30	1,10	0,16	1,11	0,16	0,863

By the results of the study in table 3 shows that the use of booklet effects in preventing diabetic neuropathy in this case foot circulation significantly increases foot circulation in preventing the occurrence of diabetic neuropathy in the intervention group 1.02 to 1.10 = 0.08 significantly higher $p = 0.000$ compared to control group difference in average value from 1.10 to 1.11 = 0.01, $p = 0.863$

Table 4 Differences in Foot Circulation in the Treatment and Control Groups in Mataram City in 2019

No	Foot Circulation	n	Mean Rank	Sum Of Rank	p
1	Intervention Group	30	35,73	1072,00	0,020
2	Control Group	30	22,27	758,00	

Based on table 4 the results of the Mann Whitney test prove that the intervention given to the treatment group was more effective than the control group ($p = 0,020$).

The results of this study are consistent with the results of Murdiyanti, Putri, & Minarsih, (2017) research using the booklet method to improve the compliance of patients with Diabetes Mellitus in the management of therapeutic regimens.

Compliance in running foot gymnastics will have an impact on foot circulation, the theory states that the goal obtained after doing foot exercises is to improve the foot circulation of diabetic patients, thereby facilitating nutrition to the tissues (Widianti, 2010). Leg movements, such as those carried out at

the third National Diabetes Educator Training Camp in 2005, can help improve blood circulation in the legs. Pain and numbness in the legs (Soegondo, 2011).

To increase blood flow and improve blood circulation. This can make the capillary network more open so that more insulin receptors can be used and activated. This condition will make it easier for nerves to receive nutrients and oxygen, thereby increasing nerve function. Increased leg movements can cause muscles to contract, thereby opening ion channels, especially positive ions which increase the flow of nerve impulses (Guyton C. Arthur and J.E.Hall, 2007). According to Smeltzer, S.C. dan Bare, (2013) also stated that the effects of exercise can make muscle cells active and function like insulin so that glucose can enter muscle cells which are then oxidized to CO₂ and water. Exercise can also increase muscle sensitivity to insulin due to an increase in Glut-4 in the muscle cell membrane, sensitivity increases for several hours after exercise, with regular exercise, also increases sensitivity to prolonged insulin to cause a lot of glucose into the cells. Exercise can also increase the number and affinity of insulin receptors in cells.

Insulin receptors increase during hunger or the body releases a lot of energy after exercise and facilitates glucose entry so that it can reduce or control blood sugar.

Table 5 Differences in Foot Sensation Before and After Intervention in the Treatment and Control Groups in Mataram City in 2019

No	Foot Sensation	n	Before		After		p
			Mean	SD	Mean	SD	
1	Intervention Group	30	8,23	1,85	9,43	1,19	0,001
2	Control Group	30	8,17	2,04	8,07	2,10	0,445

Following the results of the study in table 5 shows that the use of booklets affects in preventing

diabetic neuropathy in this case foot sensation significantly increases foot circulation in preventing the occurrence of diabetic neuropathy in the treatment group 8.23 to 9.43 = 1.2 is significantly higher p = 0,000 compared to the control group difference in the mean value from 8.17 dropped to 8.07 = - 0.1., p = 0.445

Table 6 Differences in Foot Sensation in Treatment and Control Groups in Mataram City in 2019

No	Foot Sensation	n	Mean rank	Sum of Rank	p
1	Intervention Group	30	36,55	1096,5	0,003
2	Control Group	30	24,45	733,5	

According to table 6 above, the Mann Whitney test results prove the effectiveness of the intervention given to the treatment group was more effective than the control group p = 0,003.

This change occurred due to the impact of foot exercises, this is explained by Nasution (2010) in (Sembiring, Simbolon, & Lase, 2018), suggesting that the most suitable training method for DM patients with neuropathy is leg exercise, because it can improve the use of glucose in muscles, and many open-cell capillaries, so that recent insulin becomes more active, which will affect controlled blood glucose levels.

Suhertini (2016) in Sembiring. et al., (2018) also said, regular foot exercise exercises, feelings in the legs will increase in the treatment group. This exercise reduces the discomfort of sensory neuropathy (eg pain, leg numbness) (Soegondo, 2011). Rohmad (2016) in (Sembiring. et al., 2018) if a person suffers from neuropathy, and they don't move, the sensation of the leg nerves in the foot will decrease, but if they exercise will increase the stimulation of peripheral blood flow, so as not to worsen the level of neuropathy. Suhertini & Subandi, (2016) also said that

foot exercise is effective against the treatment of diabetic neuropathy.

CONCLUSION

The use of the Raka Booklet influences and is effective in preventing diabetic neuropathy by carrying out foot care treatments, foot exercises which also affect foot circulation and foot sensation. The Puskesmas and the Health Office can facilitate the availability of the Raka booklet for DM patients. The weakness of this study is the non-random sampling technique.

REFERENCES

- Adhiarta. (2011). *Penatalaksanaan kaki diabetik, Artikel dalam Forum Diabetes Nasioanal V*. Pusat Informasi Ilmiah Departemen Ilmu Penyakit dalam FK Unpad. Bandung.
- American Diabetes Association. (2017). Standards of Medical in Diabetes. *Diabetes Care*, 40(January), s33–s43. <https://doi.org/10.2337/dc14-S014>
- Christia, S., Yuwono, A., & Fakhurrazy. (2015). Kejadian Neuropati Dan Vaskulopati Pada Pasien Ulkus Diabetik Di Poliklinik Kaki Diabetik. *Berkala Kedokteran*, 11(No.1), 25–32.
- DinKes Kota, & Mataram. (2015). *Pofil Kesehatan Kota Mataram Tahun 2015*.
- Gemilang, R. (2016). Pengembangan Booklet Sebagai Media Layanan Informasi Untuk Pemahaman Gaya Hidup Hedonisme Siswa Kelas Xi Di Sman 3 Sidoarjo. *Jurnal BK Unesa*, 6, 3–9.
- Guyton C. Arthur and J.E.Hall. (2007). *Buku Ajar Fisiologi Kedokteran* (9th ed.). EGC.
- Kuate-Tegueu, C., Temfack, E., Ngankou, S., Doumbe, J., Djientcheu, V. P., & Kengne, A. P. (2015). Prevalence and determinants of diabetic polyneuropathy in a sub-Saharan African referral hospital. *Journal of the Neurological Sciences*, 355(1–2), 108–112. <https://doi.org/10.1016/j.jns.2015.05.035>
- Kurniawan Titis, Wipa Sae-Sia, K. M. and. (2013). Effect of a Self-Management Support Program on Diabetic Foot Care Behaviors. *International Journal of Research in Nursing*, 4(1), 14–21. <https://doi.org/10.3844/ijrnsp.2013.14.21>
- Lincoln, N. B., Jeffcoate, W. J., Ince, P., Smith, M., & Radford, K. A. (2007). Validation of a new measure of protective foot care behavior: The Nottingham Assessment of Functional Footcare (NAFF). *Practical Diabetes International*, 24(4), 207–211. <https://doi.org/10.1002/pdi.1099>
- Murdiyanti, D., Putri, P., & Minarsih, D. W. (2017). Metode Booklet Diabetes Melitus (DM) Meningkatkan Kepatuhan Penyandang DM Dalam Regimen Terapeutik. *INA-Rxiv*, 001(Dm). <https://doi.org/10.31227/osf.io/hzf9q>
- NTB, D. K. (2017). *Profil Kesehatan Provinsi Nusa Tenggara Barat Tahun 2017*.
- Riskesdas. (2018). *Hasil Utama Riskesdas 2018 Kesehatan, Kementerian*.
- Rusman, Deni Kurniawan, & C. R. (2012). *Pembelajaran Berbasis Teknologi Informasi dan Komunikasi Mengembangkan Profesionalitas Gurue*. Rajawali Pers.
- Sembiring., E. E., Simbolon, P., & Lase, E. (2018). Pengaruh Senam Kaki Terhadap Penurunan Neuropati Pada Pasien Dengan Luka Kaki Diabetik Di Asri Wound Care Medan. *Jurnal Mutiara Ners*, 2(1), 114–120.
- Smeltzer, S.C. dan Bare, B. G. (2013). *Buku Ajar Keperawatan Medikal Bedah Brunner & Suddarth* (13 Vol 2). EGC.
- Soegondo, S. (2011). *Penatalaksanaan Diabetes Mellitus* (Kedua). FKUI.
- Srikartika, V. M., Akbar, M. R., & Lingga, H. N. (2019). Evaluasi Intervensi Media Booklet Terhadap Tingkat Pengetahuan dan Kepatuhan Pasien Diabetes Melitus Tipe 2 di Puskesmas Banjarbaru Selatan. *Jurnal Publikasi Kesehatan Masyarakat Indonesia*, 6(1), 27–35.
- Suhertini, C., & Subandi. (2016). Senam kaki efektif mengobati neuropati diabetik pada penderita diabetes mellitus. *Jurnal Kesehatan*, VII(3), 480–487.
- Tabatabaei-Malazy, O., Mohajeri-Tehrani, M., Madani, S., Heshmat, R., & Larijani, B. (2011). The prevalence of diabetic peripheral neuropathy and related factors. *Iran J Public Health*, 40(3), 55–62.
- Wanodya Puspitaningrum, Farid Agushybana, Atik Mawarni, D. N. (2017). Pengaruh Media Booklet Terhadap Pengetahuan Dan Sikap

Remaja Putri Terkait Kebersihan Dalam Menstruasi Di Pondok Pesantren Al-Ishlah Demak Triwulan Ii Tahun 2017. *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(4), 274–281. <http://ejournal3.undip.ac.id/index.php/jkm>

Widianti, T. A. (2010). *Senam Kesehatan* (Cetakan I). Nuha Medika.

Windani, C., Sari, M., & Haroen, Hartiah, N. (2016). Pengaruh Program Edukasi Perawatan Kaki Berbasis Keluarga terhadap Perilaku Perawatan Kaki pada Pasien Diabetes Melitus Tipe 2 Effectiveness of Family Based Foot Care Education Program towards Foot Care Behavior of Type 2 Diabetes Mellitus Patients. *JKP*, 4(3).