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BRAIN GYM EXERCISES TO IMPROVE COGNITIVE FUNCTION IN PEOPLE WITH DIATEBES MELLITUS

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ABSTRACT Diabetes mellitus (DM) is characterised by elevated blood glucose levels. Complications that can occur in people with diabetes are dementia or dementia which is included in cognitive function disorders. Cognitive impairment and dementia are some of the major health problems in the ageing population, especially aggravated by metabolic disease conditions such as diabetes mellitus. The solution offered for this problem is to conduct health education and training on the movements of the brain gym movements to the community of Banyudono hamlet, Boyolali, Central Java. Brain gymnastics is effective for improving cognitive and depression in patients with diabetes mellitus. The benefits of brain gymnastics are improving blood flow to the brain and stimulating optimal brain work and function, blood flow to all tissues becomes smooth and improves concentration.

KEYWORDS: *Diabetes mellitus, Brain Gym, Cognitive Function.*

1. INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that occurs when the pancreas does not produce enough insulin or has altered function, when the body cannot use the insulin produced effectively. Diabetes mellitus is characterised by elevated blood glucose levels (American Diabetes Association (ADA), 2019). A complication that can occur in people with diabetes is dementia or senile dementia which is included in cognitive function disorders (Xue, 2019). Cognitive impairment and dementia are some of the major health problems in the aging population, especially aggravated by metabolic disease conditions such as diabetes mellitus (Adriani, 2020).

Several studies have found an increase in the prevalence of depressive disorders and a decrease in the quality of life in patients with diabetes mellitus (DM). In the therapy of depression function, exercise is a recommended therapy for people with Diabetes mellitus (Martino et al., 2020). A person with type 2 diabetes mellitus generally has elevated blood sugar which triggers a rise in the hormones cortisol, epinephrine, and norepinephrine, all of which cause depression (Abedini, et al., 2020).

One of the ways to prevent complications in DM as mentioned above one of them is by doing brain gymnastics. Brain gymnastics is an alternative exercise for the therapy (Lina & Kurniawan, 2022). Brain gymnastics is effective for improve cognitive and depression in patients with diabetes mellitus. Brain exercise is a a collection of simple movements that aim to connect or unite the brain and body systems. unite the brain and body systems. Certain movements are believed to be important for human brain development. These movements are developed into more complex movements to enhance the learning process and maximise the abilities of (Suhari, 2019).

The benefits of brain exercises are improving blood flow to the brain as well as stimulating work and function of the brain optimally, blood flow to all tissues becomes smooth, improve reading, spelling, comprehension, writing skills, improve concentration, overcome stress, maximise learning, achieve a goal, motivate and develop personality (Panse, 2018). Through brain gym exercises, people with DM are trained to do breathing, blood flow and nerve stimulation, and stimulate a decrease in the three hormones that can reduce depression and improve their quality of life (Ginting & Afniwati, 2021).

Based on observations and interviews, the number of people with Diabetes Mellitus (DM) in t Banyudono, Boyolali reaches 15 people. Some of these people with DM do not yet know how to do brain gym to maintain health. Patients DM sufferers have not been able to do brain gym activities regularly because they are too busy with work, do not understand the time of brain gym implementation and do not memorise the brain gym movements.

Patients with diabetes mellitus are increasing in Banyudono, while knowledge about diabetes mellitus and prevention of complications is still lacking. Therefore health education and training in brain gym movements are needed for the Banyudono hamlet community. The solution offered for this problem is by conducting health education and training on brain gym movements.

This community service aims to provide education and training on brain gymnastics (brain gym for people with diabetes mellitus (DM) in Banyudono, Boyolali. Training activities are very important and useful as an effort to prevent brain complications in people with DM. In addition to brain gymnastics training, we will also conduct a concentration test and diabetes mellitus treatment services to keep their blood sugar remain under control.

The target output of this community service is the knowledge of the blood sugar level and cognitive function level of patients with diabetes mellitus (DM) in Banyudono, Boyolali. Supporting activities are carried out by conducting a general examination, namely by checking blood sugar levels of DM patients.

2. METHOD

1. Solve Problems

The activity of providing brain gymnastics exercise is designed to people with diabetes mellitus (DM) in preventing complications of DM disease. The training was carried out in collaboration with the nursing study programme at Sahid University Surakarta, one of whose courses is medical-surgical nursing and community nursing. The training was carried out and attended by students, especially the nursing study programme. The training was held one day. Participants were given material about DM and brain exercises.

The speaker in this training activity was a lecturer in the Nursing Study Programme Sahid University Surakarta who also acts as a teaching lecturer. This research is conducted in Banyudono, Boyolali, Jawa Tengah. The study focuses on people with DM. The research team commenced the study on April 27, 2024, and is expected to conclude on (end date).

2. Data Collection Technique

In the initial stage, a preliminary study was conducted by interviewing people with DM in Banyudono and the interventions they had received and carried out. Participant observation and discussion with the resource persons were then conducted to complete the data. The implementation of the service by providing brain gym which was previously explained related to DM, the definition of brain gymnastics, procedures and benefits of brain gymnastics for DM.

3. Data analysis

Conducted with a qualitative approach, which is used to analyse data from the results of observations and interviews. Observations were made on the activities of giving brain gymnastics and ended with the measurement of blood sugar and cognitive function with Mini Mental State Examination (MMSE) questionnaire.

Figure 1. a visit to the Banyudono Helmet, Boyolali, Central Java

Figure 2. brain gym exercise

Figure 3. blood glucose exam

This series of community service activities began with health counselling activities about diabetes mellitus and the benefits of brain exercises, then core activities in the form of 24-movement brain exercises and ended with blood sugar and cognitive function measurements.

3. RESULT AND DISCUSSION

This activity was attended by 39 participants diagnosed with Diabetes Mellitus (DM). Puskesmas Banyudono has implemented a routine programme every month for health checks, especially for people with Diabetes Mellitus (DM). This community service activity went smoothly and there were no problems.

Participants of this community service have good knowledge about DM, but knowledge about brain gym is still lacking. Brain gym is one method of improving cognitive function, this exercise can stimulate good physical and brain activity (Suhari et al., 2019). Participants said that they had never received counselling about brain gym, but there were participants who had ever seen it on television and practised it but the implementation is still irregular. In fact, participants did not know about brain gym movements.

Behaviour in doing brain gym is still not there, because only a few movements that they remember not even more than three movements. They still don't know when brain gym can be done and also don't know the benefits of brain gym. can be done and also do not know the benefits of

brain gym. At the time of education, participants paid close attention and followed and practised the brain gym movements. practised the brain gym movements including 24 movements (Cancela, et al, 2020).

Barriers participants when doing brain gym movements include difficulty remembering the movements, not being able to follow the movements due to old age, and said it was difficult to do brain gym in everyday life because they are not used to doing it. Type 2 diabetes mellitus is strongly associated with lower performance on multiple domains of cognitive function and with structural abnormalities of the brain. With the growing epidemic of diabetes and aging population, neural complications of diabetes are expected to rise and becoming a challenge for future health implications (American Diabetes Association, 2018; Damanik & Yunir, 2021).Therefore, the educator needs to provide a leaflet in the form of brain gym movements which can be used as a reminder of brain gym movements.

The leaflet can be opened every day so that participants can do brain gym exercise by looking at the pictures on the leaflet. Patient information leaflets are documents that are standardized in nature and provide guidance for patients or caregivers on the safe and effective use of medicines. Previous evidence suggests that written information is linked to enhancing the amount of information remembered. Currently, patients have become more involved in digital searches for information (Almanasef, 2024).

People with diabetes mellitus feel happy and comfortable with the intervention of providing brain exercises. for them this activity creates excitement and is beneficial for physical and psychological. Brain gym exercises are a simple series of exercises that can help the brain function better (Pazare et al., 2023). Mean risk of fall and cognitive function will be decreased people with diabetic neuropathy post applying brain gym (Elshemy et al., 2023).

Our community service team also measured blood glucose and cognitive function. The last activity is glucose measurement. The tool used to determine blood sugar levels (GDS) using the easy touch GCU brand with the results after the brain exercise. The results of the examination after brain gymnastics activities. The average GDS value of the participants was 95 mgdL. Controlled blood sugar for people with diabetes mellitus will have a positive impact on life expectancy and improve their quality of life (Lin et al., 2021).

The measurement of cognitive level using Mini Mental (MMSE) questionnaire. The interpretation of the MMSE measurement is that the mean value of 28 points is obtained, which means normal or no impaired cognitive function (normal cognitive function). Brain exercise activities here can be used to prevent cognitive dysfunction in people with dm so as to improve their

quality of life. Brain gym exercises is said to improve the executive functions which boosts the confidence and helps improve daily life (Andi et al., 2019).

4. CONCLUSION

The community service activities carried out by the outreach team have proven to be a new experience for both lecturer and student team members and people with diabetes mellitus in banyodono hamlet. During the activities, people with diabetes mellitus not only engage in learning but also enjoy the fusion of gymnastics and education. The positive impact seen in banyudono serves as an encouraging model for future community service initiatives, emphasising the importance of a holistic and engaging approach to education to motivate and enthuse. In addition, they know their glucose levels after the community service activities. The interactive nature of these activities allows them to expand their knowledge. Most importantly, they did not experience boredom during the session, and showed a desire to participate in this brain exercise activity. It can be concluded that brain exercises are very useful for people with diabetes mellitus. Therefore, people with diabetes mellitus are expected to apply or do brain exercises to control their disease, increase their cognitive function and quality of life.

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Thus the report of this brain gymnastics counselling activity is made with the hope that it can be used as a consideration for follow-up. In this case we really hope for the participation of all parties so that this brain exercise activity can be carried out. We apologise if there are any errors in the preparation of this report. We thank the banyudono community health centre for giving us permission to carry out community service for people with diabetes mellitus and also to the LPPM of sahid university surakarta for funding this community service.

CONFLICT OF INTERESTS

We have no conflicts of interest to disclose. The limitation in this community service activity is that people with diabetes mellitus sometimes forget the brain exercise movements that have been taught, but the educator has provided a leaflet so that they still remember the movements that have been taught.

REFERENCES

Abedini, M. R., Bijari, B., Miri, Z., Shakhs Emampour, F., & Abbasi, A. (2020). The quality of life of the patients with diabetes type 2 using EQ-5D-5 L in Birjand. Health and quality of life outcomes, 18, 1-9.

Almanasef, M. (2024). Patient information leaflet in the era of digitalisation: a cross-sectional study on patients' attitudes and practices. Irish Journal of Medical Science (1971-), 193(2), 777-782.

American Diabetes Association. (2018). 6. Glycemic targets: standards of medical care in diabetes—2018. Diabetes care, 41(Supplement_1), S55-S64.

American Diabetes Association. (2019). Standards of medical care in diabetes 2019. Diabetes Care, 42(Suppl 1), S124-38

Andi, P., Dharma, K. K., Purwanto, E., Firdaus, R., & Loriana, R. (2019). The intervention of Brain Gym in increasing the quality of life on the elderly. Asian Community Health Nursing Research, 28-28.

Cancela, J. M., Casal, Á., Sánchez-Lastra, M. A., & Ayán, C. (2020). Brain gym exercises versus standard exercises for institutionalised older people with cognitive impairment: A randomised controlled study. Asian Journal of Gerontology and Geriatrics, 15(1), 1-7.

Ginting, S., & Afniwati, Y. (2021). The effect of brain GYM on the dementia and depression reduction of the elderly. Journal of Advanced Pharmacy Education & Research| Apr-Jun, 11(2), 41.

Damanik, J., & Yunir, E. (2021). Type 2 Diabetes Mellitus and Cognitive Impairment. Acta Medica Indonesiana, 53(2), 213-220.

Elshemy, M. B., Fareed, M. E., & Deep, S. H. (2023). Effect of Applying Brain Gym Exercises on Balance and Concerns about falls among Patients with Diabetic Neuropathy. Menoufia Nursing Journal, 8(4), 149-170.

Lin, R., Brown, F., James, S., Jones, J., & Ekinci, E. (2021). Continuous glucose monitoring: a review of the evidence in type 1 and 2 diabetes mellitus. Diabetic Medicine, 38(5), e14528.

Lina, R. K., & Kurniawan, G. P. D. (2022). Brain Gym Exercise Give Benefit to Improve Cognitive Function among Elderly: A Systematic Review. Jurnal Ilmu dan Teknologi Kesehatan, 9(2), 261-271.

Martino, G., Caputo, A., Bellone, F., Quattropani, M. C., & Vicario, C. M. (2020). Going beyond the visible in type 2 diabetes mellitus: defense mechanisms and their associations with depression and health-related quality of life. Frontiers in Psychology, 11, 519034.

Panse, R., Deshpande, M., Yeole, U., & Pawar, P. (2018). Effect of brain gym® exercises on balance and risk of fall in patients with diabetic neuropathy. International Journal of Science and Healthcare Research, 3(4), 257-262.

Pazare, S., Fernandes, F., & Sadawarte, S. (2023). The Effect of Brain Gym Exercises on Cognition among Geriatrics. VIMS Health Science Journal, 10(1), 13-19.

Suhari, S., Astuti, A., Rahmawati, P. M., & Musviro, M. (2019). Brain Gym Improves Cognitive Function for Elderly With Demensia. In International Conference of Kerta Cendekia Nursing Academy (Vol. 1, No. 1).

Xue, M., Xu, W., Ou, Y. N., Cao, X. P., Tan, M. S., Tan, L., & Yu, J. T. (2019). Diabetes mellitus and risks of cognitive impairment and dementia: A systematic review and meta-analysis of 144 prospective studies. Ageing research reviews, 55, 100944.