**The effectiveness of *Myrmeleon* sp in reducing blood sugar levels to diabetess mellitus patients in the Batui health center Banggai Regency.**

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**Abstract**

*Myrmeleon* sp. is an insect that lives in the soil that some people believe in a certain ethnicity in the treatment of Diabetes disease. This research aims to find out the effectiveness of *Myrmeleon* sp in lowering blood sugar levels of Diabetes Mellitus patients in the working area of Puskesmas Batui Banggai Regency. This type of research is a "Quasi experiment" using the design of One group Pretest-Posttest. The study sample was patients diagnosed with Diabetes mellitus in the working area of Batui Health Center Banggai Regency, Respondents were divided into a group of experiments that were previously sampled selected with purposive sampling techniques, then the data was analyzed to find out the effectiveness of *Myrmeleon* sp, To test the hypothesis of this study used Wilcoxon Signed Rank Test with SPSS program. The results showed that there was a significant difference between GDS measurements before and after *Myrmeleon* sp consumption. It concluded that *Myrmeleon* sp is effective in lowering blood sugar levels in patients with Diabates mellitus.

Key words : *Myrmelleon*, diabetes mellitus.

**Introduction**

The main health problem experienced by developing countries today is the diabetess mellitus (Brown et al., 2005; Morgan & Harris, 2015). Diabete mellitus (DM) is a condition in which blood sugar levels exceed normal limits otherwise known as hyperglycemia (Verma et al., 2006), if the condition is not well controlled leads to various complications of the disease which will aggravate the condition leading to death (Deshpande et al., 2008). Diabetes mellitus is one of the top causes of death in the world (Mathers et al., 2009). The largest increases in prevalence occurred in South Asian and African (Bindraban et al., 2008) of risk factors include urbanization, age and unhealthy lifestyle (Motala, 2002), and projected rise to 366 million in 2030 (Wild et al., 2004). Indonesia is one of the top ten countries of diabetes prevalence in Asia (Ramachandran et al., 2010). The prevalence of diabetes predicated a potentially increase in Indonesia (Sutanegara et al., 2000). In Indonesia was 1.1% of the total population aged 15 years and over, increasing to 2.1% in 2013 (Kurnia et al., 2017).

The highest prevalence of diabetes mellitus in Indonesia is found in Central Sulawesi (3.7%), cases of patients at Anutapura Palu Hospital were reported in 2017 as many as 4177 sufferers (Hardayanti et al., 2018). Based on the report Health Office of Central Sulawesi in 2018, the number of DM patients reached 6,547 cases. In health clinic of Kampung Baru Luwuk Banggai District was recorded that increased of diabetes mellitus case namely 50 clients in 2014 and 85 clients in 2015 (Yulianti & Rayasari, 2016).

Generally, the treatment of diabetes mellitus is carried out using antidiabetic drugs (Hampp et al., 2014) or insulin injection (Petznick, 2011; Zeyfang et al., 2012). Traditional therapy is also rated quite effective for the treatment of diabetes and have few side effects (Seto et al., 2015). One of the natural ingredients that can be used for the treatment of DM is *Myrmeleon* sp (Maryati et al., 2019). Methanolic extract of *Myrmeleon* sp sphad the highest inhibitory activity toward α-glucosidase enzyme (Rahma et al., 2016), and can significantly lower of blood glucose levels (Rahma et al., 2016). This study aimed to examine the effectiveness of *Myrmeleon* sp to lower blood sugar in diabetes mellitus patients at Batui health center Banggai Regency.

**Methods**

The type of this research is quasi experiment, used one group pretest-posttest design, where the research subjects were divided into one experimental group, a pretest was given before treatment, after that a posttest was carried out to determine the results of the study. The subjects of this study were 40 patients diagnosed with diabetes mellitus in the working area of ​​ Batui health center Banggai Regency. The sample selection used a purposive sampling technique, including: (a) chronic diabetes mellitus patients, (b) having blood sugar levels (GDS) more than the normal limit> 180 mg / dl when the treatment is going to be carried out (c) the patient who is willing / agree to be given the *Myrmeleon* sp consumption (d) there is not experiencing serious complications from diabetes mellitus

The experiment was conducted twice observationally before and after treatment. Research with one group pre-test and post-test design design is conducted in three stages. The first, measuring the dependent variable, namely blood sugar levels before the *Myrmeleon* sp test (pre-test). The second, giving treatment, namely consumption of *Myrmeleon* sp, and the third, measuring differences in GDS levels after treatment (post-test). The treatment is given for 7 days by consuming *Myrmeleon* sp. The data were collected using a questionnaire and observation sheet measuring blood sugar levels through a glucometer examination where normal is within the GDS range of 100mg / dl - 180 mg / dl, mild diabetes if the GDS level is in the range 200mg / dl - 350 mg / dl, and severe diabetes if in the range of more than 350 mg / dl. The data were analyzed used Wilcoxon Signed Rank Test (Reidy & Dancey, 2007) using SSPS program.

**Result and Discussion**

Based on table 1 showed that the age group of respondents is at most 50% in the age range 56 - 65 years, this shows that the majority of people with diabetes are at a degenerative age before reaching the old elderly period. The data above shows that there is sufficiently strong evidence that age will increase the risk of increasing blood sugar in the body

Table. 1 Distribution of respondents by Age, Gender, Profession  (N=40)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Characteristics** | **Frequency (n)** | **Percentage (%)** |
| 1 | Age |  |  |
| <26 years | 0 | 0 |
| 26-35 years | 0 | 0 |
| 36-45 years | 5 | 12.5 |
| 46-55 years | 13 | 32.5 |
| 56-65 years | 20 | 50 |
| > 65 years | 2 | 5 |
| 2 | Gender |  |  |
| Male | 23 | 57.5 |
| Female | 17 | 42.5 |
| 3 | Profession |  |  |
| Housewife | 11 | 27.5 |
| General employees | 7 | 17.5 |
| Farmer | 4 | 10 |
| Government employees | 10 | 25 |
| Retired | 8 | 20 |

The gender with the majority of diabetes is male as much as 57.5%, while the work group with low activity has the largest percentage, namely as housewives 27.5%. This is in line with research published in The Scottish Diabetes Research Network Epidemiology from the University of Glascow which states that men are more likely to be insulin sensitive than women, thus increasing the risk of diabetes. Dolongseda et al., (2017) concluded that there is a relationship between physical activity patterns and blood sugar levels in Type II DM patients.

Based on the measurement of blood sugar levels when using a glucometer to 40 respondents before the treatment of *Myrmeleon* sp consumption was carried out, it was found that respondents who had normalblood sugar levels were 0%, and respondents who had mild blood sugar levels were 62.5% and then 37.5% for severe blood sugar level (Table 2). The results of measuring blood sugar levels using a glucometer after the treatment of *Myrmeleon* sp consumption above showed a decrease in blood sugar levels after being given the action on the seventh day. So that the table states that there is a decrease in GDS which is on a weight scale which originally had 15 respondents (37.5%) down to 9 respondents (22.5%) and the normal category became 11 respondents (27.5%) where previously there were no respondents who had normal GDS levels. *Myrmeleon* sp spextract can be used to control blood glucose and at the same time lower hematocrit concentrations that generally accompany DM (Susanto et al., 2020). Based on the results of the research by Muadifah et al., (2017) using the LC-UV method that the extract *Myrmeleon* sp. contained metformin, one of compounds for hyperglycemia treatment type 2-diabetes. In addition, the results of research by Mujahid et al., (2013) also explain that, the combination of bitter gourd and ant lion larvae (75:25 w/w percentage) exhibited hypoglycaemic effect by 32.20+2.57%. Metformin, an antidiabetic agent with extrapancreatic action, decreased the blood glucose level by 39.29+2.96%.

Table 2. Distribution of respondents based on Glucose levels prior to and after consuming *Myrmelleon* (N = 40)

|  |  |  |  |
| --- | --- | --- | --- |
| Glucose levels | Before to consuming *Myrmeleon* sp | After consuming *Myrmeleon* sp | p Value |
| n (%) | n (%) |
| Normal |  |  |  |
| 100mg/dl – 180 mg/dl | 0 (0%) | 11 (27.5%) | 0.000 |
| Mild |  |  |  |
| 200mg/dl – 350mg/dl | 25 (62.5%) | 20 (50%) |  |
| Severe |  |  |  |
| >350mg/dl | 15 (37.5%) | 9 (22.5%) |  |

          Based on the measurement of blood sugar levels when using a glucometer to 40 respondents before the treatment of *Myrmeleon* sp consumption was carried out, it was found that respondents who had mild blood sugar levels were 62.5%. Even though it is mild, a person with blood sugar levels above 180mg / dl is still diagnosed with Diabetes mellitus, which will have harmful secondary effects on the body including complications that lead to a more severe condition. Meanwhile, the percentage of respondents who had a heavy blood sugar level of 37.5% would certainly be a destructive threat to the respondent's condition. The state of high sugar levels above normal continuously (chronically) must be addressed immediately to get back to normal controlled blood sugar conditions. The results of measuring blood sugar levels using a glucometer after the treatment of *Myrmeleon* sp consumption above showed a decrease in blood sugar levels after being given the action on the seventh day. This means that there is a significant difference between GDS measurements before and after the consumption of *Myrmeleon* sp.

**Conclusion**

The majority of people with diabetes are at a degenerative age before reaching the old elderly period. The gender with the majority of diabetes is male as much as 57.5%, while the work group with low activity has the largest percentage, namely as housewives 27.5%. The treatment of Myrmellleon consumption showed that there is a decrease in GDS which is on a weight scale which originally had 15 respondents (37.5%) down to 9 respondents (22.5%) and the normal category became 11 respondents (27.5%) where previously there were no respondents who had normal GDS levels. So that it can be concluded that *Myrmeleon* sp is effective in reducing blood sugar levels in people with diabetes mellitus.

**References**

Bindraban, N. R., Van Valkengoed, I. G. M., Mairuhu, G., Holleman, F., Hoekstra, J. B. L., Michels, B. P. J., Koopmans, R. P., & Stronks, K. (2008). Prevalence of diabetes mellitus and the performance of a risk score among Hindustani Surinamese, African Surinamese and ethnic Dutch: A cross-sectional population-based study. *BMC Public Health*, *8*(1), 1–10. https://doi.org/10.1186/1471-2458-8-271

Brown, J., Wessells, H., Chancellor, M., Howards, S., Stamm, W., Stapleton, A., Steers, W., Van Den Eeden, S., & McVary, K. (2005). Urological complications of diabetes. *Diabetes Care*, *28*(1), 177–185. https://doi.org/10.2337/diacare.28.1.177

Deshpande, A., Harris-Hayes, M., & Schootman, M. (2008). Epidemiology of Diabetes and Diabetes-Related Complications. *Physical Therapy*, *88*(11), 1254–1264.

Dolongseda, F., Masi, G., & Bataha, Y. (2017). Hubungan Pola Aktivitas Fisik Dan Pola Makan Dengan Kadar Gula Darah Pada Pasien Diabetes Melitus Tipe Ii Di Poli Penyakit Dalam Rumah Sakit Pancaran Kasih Gmim Manado. *Jurnal Keperawatan UNSRAT*, *5*(1), 1–8.

Hampp, C., Borders-Hemphill, V., Moeny, D. G., & Wysowski, D. K. (2014). Use of antidiabetic drugs in the U.S., 2003-2012. *Diabetes Care*, *37*(5), 1367–1374. https://doi.org/10.2337/dc13-2289

Hardayanti, K., Rau, M., & Arifuddin, A. (2018). Pengaruh perilaku pengendalian diabetes melitus terhadap kadar gula darah pasien di Rumah Sakit Umum Anutapura Kota Palu. *Jurnal Kesehatan Tadulako*, *4*(3), 61–66.

Kurnia, A. D., Amatayakul, A., & Karuncharernpanit, S. (2017). Predictors of diabetes self-management among type 2 diabetics in Indonesia: Application theory of the health promotion model. *International Journal of Nursing Sciences*, *4*(3), 260–265. https://doi.org/10.1016/j.ijnss.2017.06.010

Maryati, Y., Alifiar, I., Nurfatwa, M., Nofianti, T., & Rahayuningsih, N. (2019). Antlion (Myrmeleon spsp.) Infusion as Antidiabetic in Dexamethasone Induced Mice. *Journal of Physics: Conference Series*, *1179*(1). https://doi.org/10.1088/1742-6596/1179/1/012177

Mathers, C. D., Boerma, T., & Ma Fat, D. (2009). Global and regional causes of death. *British Medical Bulletin*, *92*(1), 7–32. https://doi.org/10.1093/bmb/ldp028

Morgan, B. P., & Harris, C. L. (2015). Complement, a target for therapy in inflammatory and degenerative diseases. *Nature Reviews Drug Discovery*, *14*(12), 857–877. https://doi.org/10.1038/nrd4657

Motala, A. A. (2002). Diabetes trends in Africa. *Diabetes/Metabolism Research and Reviews*, *18*(3), 14–20. https://doi.org/10.1002/dmrr.284

Muadifah, A., Sulistyarti, H., & Prasetyawan, S. (2017). Liquid Chromatography for Analysis of Metformin in Myrmeleon spsp. *The Journal of Pure and Applied Chemistry Research*, *6*(3), 196–206. https://doi.org/10.21776/ub.jpacr.2017.006.03.338

Mujahid, M. Z., Agistia, D. D., Sa’adah, M., & Nugroho, A. E. (2013). A combination of bitter gourd ethanolic extract with ant lion larvae aqueous extract for a blood glucose-lowering agent. *International Food Research Journal*, *20*(2), 851–855.

Petznick, A. (2011). Insulin Management of Type 2 Diabetes Mellitus. *American Family Physician*, *84*(2), 183–190.

Rahma, H. H., Sundhani, E., & Nurulita, N. A. (2016). Antidiabetic activity of powder and ethanolic extract of antlion (Myrmeleon spsp.) on wistar strain white male rats with glucose preload. *Proceeding ICMHS 2016*, 14–16.

Ramachandran, A., Wan Ma, R. C., & Snehalatha, C. (2010). Diabetes in Asia. *The Lancet*, *375*(9712), 408–418. https://doi.org/10.1016/S0140-6736(09)60937-5

Seto, S. W., Yang, G. Y., Kiat, H., Bensoussan, A., Kwan, Y. W., & Chang, D. (2015). Diabetes mellitus, cognitive impairment, and traditional chinese medicine. *International Journal of Endocrinology*, *2015*, 1–14. https://doi.org/10.1155/2015/810439

Susanto, D. H., Kartika, R. W., Heng, P. H., Santoso, A. W., Lopulalan, M. V., & Wijaya, A. (2020). Pengaruh Ekstrak Undur-undur ( Myrmeleon spsp ) terhadap Glukosa Darah dan Hematokrit pada Tikus Diabetes. *Jurnal Ilmiah Kedokteran Wijaya Kusuma*, *9*(2), 209–217.

Sutanegara, D., Darmono, & Budhiarta, A. (2000). The epidemiology and management of diabetes mellitus in Indonesia. *Diabetes Research and Clinical Practice*, *50*(2000), 9–16. https://doi.org/10.1016/S0168-8227(00)00173-X

Verma, M., Paneri, S., Badi, P., & Raman, P. (2006). Effect of increasing duration of diabetes mellitus type 2 on glycated hemoglobin and insulin sensitivity. *Indian Journal of Clinical Biochemistry*, *21*(1), 142–146. https://doi.org/10.1007/BF02913083

Wild, S., Roglic, G., Green, A., Sicree, R., & King, H. (2004). Global Prevalence of Diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care*, *27*(5), 1047–1053. https://doi.org/10.2337/diacare.27.5.1047

Yulianti, S., & Rayasari, F. (2016). The Impact of Telenursing Assistance on the Glycemic Levels of Type II DM Clients at Local Healt Clinic Kampung Baru In Banggai 2016. *The 2nd International Multidisciplinary Conference*, 735–743.

Zeyfang, A., Berndt, S., Aurnhammer, G., Nikolaus, T., Oster, P., & Bahrmann, A. (2012). A short easy test can detect ability for autonomous insulin injection by the elderly with diabetes mellitus. *Journal of the American Medical Directors Association*, *13*(1), 15–18. https://doi.org/10.1016/j.jamda.2010.10.006