# Pengaruh Fasting-Mimicking Diet terhadap Kadar Glukosa Darah dan Nilai Homeostasis Model Assessment of insulin Resistance pada Tikus Model Hiperglikemia = Effects of Fasting-Mimicking Diet on Blood Glucose Levels and Homeostasis Model Assessment of Insulin Resistance Values in Hyperglycemic Rat Model

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Abstrak

Hiperglikemia merupakan gejala metabolik berupa peningkatan glukosa darah melebihi batas normal, yang dikaitkan dengan diabetes melitus (DM). Modifikasi gaya hidup yang lebih sehat, seperti dilakukannya restriksi kalori dengan metode fasting-mimicking diet (FMD) dapat dilakukan sebagai alternatif pendekatan untuk pengendalian DM tipe 2. Penelitian ini bertujuan untuk mengetahui pengaruh FMD berbahan nabati yang tersedia di Indonesia, terhadap kadar glukosa darah dan resistensi insulin. Penelitian dilakukan terhadap tikus jantan galur Sprague-Dawley model hiperglikemia yang dibagi menjadi 4 kelompok perlakuan (n=16), yakni kelompok hiperglikemia (high fat diet[HFD]-streptozotosin[STZ] 35 mg/kgBB dan CMC Na 0,5%), kelompok metformin (HFD-STZ 35 mg/kgBB dan metformin 250 mg/kgBB), kelompok FMD (HFD-STZ 35 mg/kgBB dan FMD), dan kelompok normal diet (ND) (CMC Na 0,5%). Pemberian perlakuan dilakukan selama 28 hari. Tikus dilakukan pengecekan glukosa darah puasa (GDP) dan berat badan setiap minggu perlakuan dan dikorbankan untuk diambil sampel darahnya setelah perlakuan berakhir. Homeostasis model assessment of insulin resistance (HOMA-IR) digunakan untuk mengukur resistensi insulin. Hasil penelitian menunjukkan penurunan kadar GDP dengan adanya pemberian FMD, walaupun tidak terdapat perbedaan signifikan antara GDP pra-perlakuan dengan GDP minggu ke-4 perlakuan ($p>0,05$). Hasil penelitian juga menunjukkan nilai HOMA-IR kelompok FMD mendekati nilai HOMA-IR kelompok ND dan lebih rendah secara signifikan dibandingkan nilai HOMA-IR kelompok hiperglikemia ($p<0,05$), yang berarti pemberian FMD pada tikus hiperglikemia menghasilkan tingkat resistensi insulin yang lebih rendah dibandingkan dengan tikus hiperglikemia yang tidak diberikan FMD. Sebagai kesimpulan, pemberian FMD dapat menurunkan GDP dan menghasilkan tingkat resistensi insulin yang lebih rendah pada tikus model hiperglikemia.

..... Hyperglycemia is a metabolic symptom in the form of an increase in blood glucose exceeding normal limits, which is associated with diabetes mellitus (DM). Healthy lifestyle modifications, such as calorie restriction with the fasting-mimicking diet (FMD) method, can be used as an alternative approach to controlling type 2 diabetes. This study aims to determine the effect of FMD using plant-based ingredients available in Indonesia on blood glucose levels and insulin resistance. The study was conducted on male rats of the Sprague-Dawley strain model of hyperglycemia, which were divided into 4 treatment groups (n = 16), namely the hyperglycemic group (high fat diet [HFD]-streptozotocin [STZ] 35 mg/kgBW and CMC Na 0.5%), the metformin group (HFD-STZ 35 mg/kgBW and metformin 250 mg/kgBW), the FMD group (HFD-STZ 35 mg/kgBW and FMD), and the normal diet (ND) group (CMC Na 0.5%). The treatment was carried out for 28 days. Rats were checked for fasting blood glucose (FBG) and body weight every week of treatment and sacrificed for blood samples after the treatment ended. Homeostasis model assessment of insulin resistance (HOMA-IR) was used to measure insulin resistance. The results showed a decrease in

FBG levels with the administration of FMD, although there was no significant difference between pre-treatment FBG and FBG at the 4th week of treatment ($p>0,05$). The results also showed that the HOMA-IR value of the FMD group was close to the HOMA-IR value of the ND group and was significantly lower than the HOMA-IR value of the hyperglycemic group ($p<0,05$), which means that administering FMD to hyperglycemic rats resulted in lower levels of insulin resistance than the hyperglycemic rats that were not given FMD. In conclusion, administration of FMD can reduce FBG and result in lower levels of insulin resistance in hyperglycemic rats.