ABSTRAK

Latar Belakang: Mayoritas penyandang diabetes mellitus (DM) di Kota Malang memiliki kontrol glikemik buruk. Cara paling efektif untuk memperbaiki kontrol glikemik adalah kepatuhan diet dan latihan fisik. Penerimaan diabetisi terhadap makanan yang direkomendasikan secara signifikan memengaruhi tingkat kepatuhan. Rekomendasi harus mempertimbangkan pilihan makanan, ketersediaan, dan keterjangkauan makanan.
Tujuan: Mengembangkan rekomendasi menu makanan*/Food-Based Recommendation* (FBR) berbasis *Linear Programming* menggunakan Optifood untuk mengendalikan kontrol glikemik penyandang DM tipe 2 di Kota Malang.
Metode: Penelitian kuantitatif ini menggunakan desain *pre-post quasy eksperimental*. Sebanyak 69 partisipan dengan DM tipe 2 (usia 50 – 64 tahun) dibagi secara acak ke dalam: kelompok FBR (n = 24), FBR dikombinasikan dengan latihan fisik (FBR+LF) (n = 24), dan kontrol (n = 21). Pengembangan FBR menggunakan *Linear Programming* dengan *software* Optifood WHO, berdasarkan data pola makan (174 responden), ketersediaan pangan lokal, *problem nutrient* dan kebutuhan gizi. Intervensi berlangsung selama 1 bulan. Penilaian *pre* dan *post* intervensi meliputi: kepatuhan diet, kepatuhan aktivitas fisik, dan parameter kontrol glikemik (glukosa darah puasa, GD2JPP, dan *Glycated albumin* (GA)). Analisis statistik menggunakan one way ANOVA dan uji Kruskal–Wallis.
Hasil: Protein ditemukan sebagai *problem nutrient* pada responden laki-laki, sedangan kalsium dan vitamin B6 pada responden perempuan. Pemenuhan protein, serat, vitamin A, C, E, B12, zat besi, dan omega-3 dapat dioptimalkan >65% AKG menggunakan rekomendasi pangan lokal seperti tempe, nasi jagung, daun kelor, tongkol, pisang kepok, dan kacang koro, namun kalsium, vitamin B6, dan seng ditemukan tidak memenuhi 65% RNI. Kelompok FBR dan FBR+LF menunjukkan peningkatan kepatuhan asupan makanan. Kelompok FBR+LF menunjukkan perbaikan signifikan pada semua parameter kontrol glikemik setelah periode intervensi.
Kesimpulan: Pangan lokal berhasil dimasukkan ke dalam rekomendasi diet dan memenuhi kecukupan delapan jenis zat gizi namun gagal memenuhi vitamin B-6, kalsium, dan seng. Mengintegrasikan rekomendasi makanan lokal dengan aktivitas fisik berhasil meningkatkan kontrol glikemik pada DM.

Keyword: *food-based recommendation*, diabetes melitus tipe 2, *Linear Programming,* latihan fisik, kontrol glikemik

ABSTRACT

***Background**: Many people with diabetes mellitus (DM) in Malang City have poor glycemic control. The most effective way to improve glycemic control is dietary adherence and physical exercise. Diabetics' acceptance of recommended foods significantly affects the level of adherence. Recommendations should consider food choices, availability, and affordability of food.*
***Objective**: Develop a Food-Based Recommendation (FBR) based on Linear Programming using Optifood to control glycemic control of patients with type 2 diabetes mellitus in Malang City.*
***Methods**: This quantitative study used a quasi-experimental pre-post design. A total of 69 participants with type 2 DM (aged 50 – 64 years) were randomly divided into: the FBR group (n = 24), FBR combined with physical exercise (FBR+LF) (n = 24), and control (n = 21). The development of FBR uses Linear Programming with Optifood WHO software, based on dietary data (174 respondents), local food availability, nutrient problems, and nutritional needs. The intervention lasted for 1 month. Pre- and post-intervention assessments included: dietary adherence, physical activity adherence, and glycemic control parameters (fasting blood glucose, GD2JPP, and Glycated albumin (GA)). Statistical analysis using one-way ANOVA and Kruskal–Wallis test.*
***Results**: Protein was found to be a problem nutrient in male respondents, while calcium and vitamin B6 in female respondents. The fulfillment of protein, fiber, vitamins A, C, E, B12, iron, and omega-3 can be optimized >65% of the AKG using local food recommendations such as tempeh, corn rice, moringa leaves, cobs, kepok bananas, and koro beans, but calcium, vitamin B6, and zinc were found to not meet 65% of the RNI. The FBR and FBR+LF groups showed increased adherence to food intake. The FBR+LF group showed significant improvement in all glycemic control parameters after the intervention period.*
***Conclusion**: Local foods were successfully included in dietary recommendations and met the adequacy of eight types of nutrients, but failed to meet vitamin B-6, calcium, and zinc. Integrating local food-based recommendations with physical activity improves glycemic control in DM.*

Keywords: food-based recommendation, diabetes mellitus type 2, Linear Programming, exercises, glycemic control