ABSTRAK

Diabetes melitus tipe 2 adalah penyakit metabolik yang terjadi secara kronis dalam tubuh manusia diakibatkan oleh kelainan sekresi dan kerja hormon insulin akibat adanya kegagalan sel beta pankreas. Metformin merupakan obat antidiabetes oral lini pertama dikarenakan efektivitasnya dalam menurunkan kadar HbA1c yang paling tinggi di antara obat antidiabetes oral. OCT1 merupakan protein transporter yang memiliki fungsi untuk memediasi absorbsi dan distribusi metformin. OCT1 dikode oleh suatu gen yang disebut *SLC22A1* (*Solute-like Carrier family 22 member 1*). Varian genetik *SLC22A1* rs594709 memiliki implikasi klinis dalam penyerapan dan distribusi metabolit metformin dalam tubuh. Penelitian ini bertujuan untuk mengetahui pengaruh variasi genetik *SLC22A1* rs594709 terhadap kadar HbA1c pada pasien diabetes melitus tipe 2 yang mendapatkan terapi metformin di Kabupaten Sleman. Penelitian yang digunakan adalah penelitian observasional dengan pendekatan studi *cross-sectional*. Pengambilan dan pengukuran data dilakukan pada pasien baru terdiagnosa diabetes melitus tipe 2 dengan rentang usia 40-75 tahun dan mendapatkan monoterapi metformin sebanyak 60 subjek. Data dianalisis menggunakan metode PCR-T-ARMS dan pembacaan hasil menggunakan metode elektroforesis. Hasil yang didapat diuji menggunakan *chi-square* untuk menganalisis pengaruh variasi genetik *SLC22A1* rs594709 terhadap kadar HbA1c. Hasil penelitian menunjukkan bahwa genotipe GG berisiko 1,5 kali memiliki kadar HbA1c yang lebih tinggi dibandingkan genotipe GA (*p-value* = 0,637, OR = 1,536). Sedangkan, alel G berisiko 1,1 kali memiliki kadar HbA1c yang lebih tinggi dibandingkan alel A (*p-value* = 0,795, OR = 1,145). Variasi genetik *SLC22A1* rs594709 tidak memiliki pengaruh yang signifikan terhadap kadar HbA1c pada pasien diabetes melitus tipe 2 dengan terapi metformin di Kabupaten Sleman.

Kata kunci: Diabetes melitus tipe 2, metformin, *SLC22A1*, rs594709, HbA1c.

ABSTRACT

Type 2 diabetes mellitus is a chronic metabolic disease that occurs in the human body due to abnormalities in the secretion and function of the hormone insulin because of pancreatic beta cell failure. Metformin is the first-line oral antidiabetic drug due to its effectiveness in lowering HbA1c levels, which is the highest among oral antidiabetic drugs. OCT1 is a transporter protein that mediates the absorption and distribution of metformin. OCT1 is encoded by a gene called SLC22A1 (Solute-like Carrier family 22 member 1). The SLC22A1 rs594709 genetic variant has clinical implications for the absorption and distribution of metformin metabolites in the body. This study aims to determine the effect of the SLC22A1 rs594709 genetic variation on HbA1c levels in patients with type 2 diabetes mellitus receiving metformin therapy in Sleman Regency. The study used an observational approach with a cross-sectional design. Data collection and measurement were conducted on 60 subjects who were newly diagnosed with type 2 diabetes mellitus, aged 40-75 years, and receiving metformin monotherapy. Data were analyzed using the PCR-T-ARMS method and the results were read using the electrophoresis method. The results were tested using chi-square to analyze the effect of SLC22A1 rs594709 genetic variation on HbA1c levels. The results showed that the GG genotype had a 1.5 times higher risk of having higher HbA1c levels than the GA genotype (p-value = 0.637, OR = 1.536). Meanwhile, the G allele carries a 1.1 times higher risk of HbA1c levels compared to the A allele (p-value = 0.795, OR = 1.145). Genetic variation in SLC22A1 rs594709 does not have a significant effect on HbA1c levels in type 2 diabetes mellitus patients undergoing metformin therapy in Sleman Regency.

Keywords: *Type 2 diabetes mellitus, metformin, SLC22A1, rs594709, HbA1c.*