Tesis

KESESUAIAN NILAI DIAGNOSTIK KADAR *LOW DENSITY LIPOPROTEIN CHOLESTEROL* RUMUS FRIEDEWALD, HOPKINS DAN SAMPSON DENGAN *METODE DIRECT HOMOGENOUS ASSAY* PADA DIABETES MELITUS TIPE 2

Oleh:
Suci Alillah Muztika
NBP. 1650307201

Pembimbing :

1. **Prof. Ellyza Nasrul, Dr., dr., SpPK(K)**
2. **Dwi Yulia, Dr., dr., Sp PK**

PROGRAM STUDI PATOLOGI KLINIS PROGRAM SPESIALIS
FAKULTAS KEDOKTERAN UNAND/RSUP DR.M.DJAMIL
PADANG
2022

KESESUAIAN NILAI DIAGNOSTIK KADAR *LOW DENSITY LIPOPROTEIN CHOLESTEROL* RUMUS FRIEDEWALD, HOPKINS DAN SAMPSON DENGAN METODE *DIRECT HOMOGENOUS ASSAY* PADA DIABETES MELITUS TIPE 2

ABSTRAK

Latar Belakang: Risiko penyakit kardiovaskuler pasien Diabetes melitus tipe 2 (DMT2) meningkat sehingga target terapi kadar LDL-C lebih rendah. Pemeriksaan LDL-C *direct* direkomendasikan pada pasien DMT2 karena rumus Friedewald dapat menyebabkan hasil rendah palsu pada kadar LDL-C rendah dan trigliserida tinggi. Rumus Hopkins dan Sampson memiliki akurasi yang baik pada kadar LDL-C rendah dan trigliserida tinggi. Penelitian ini bertujuan mengetahui kesesuaian dan nilai diagnostik kadar LDL-C rumus Friedewald, Hopkins dan Sampson dengan metode *direct homogenous assay* pada pasien DMT2.

Metode: Penelitian analitik dengan rancangan potong lintang pada 136 subjek pasien DMT2 di RSUP Dr. M. Djamil Padang dari bulan Mei tahun 2021 hingga Februari 2022. Kadar LDL-C rumus Friedewald, Hopkins dan Sampson dihitung dari hasil pemeriksaan profil lipid. LDL-C juga diukur dengan metode *direct homogenous assay*. Data dianalisis untuk mengetahui kesesuaian dengan Plot Bland Altman. Kadar LDL-C rumus Friedewald, Hopkins dan Sampson yang memenuhi *allowable total error* (TEa) dihitung dengan metode *direct homogenous assay* sebagai standar. Nilai sensitivitas dan spesifisitas dihitung menggunakan tabel 2 x 2 dengan *cut-off* kadar LDL-C 70 mg/dL.

Hasil: Rerata selisih rumus Friedewald, Hopkins dan Sampson dengan metode *direct homogenous assay* masing-masing adalah -4,48 mg/dL, 0,62 mg/dL dan -0,96 mg/dL. Kadar LDL-C rumus Friedewald, Hopkins dan Sampson dengan kadar LDL-C metode *direct homogenous assay* pasien DMT2 memiliki *limit of agreement* masing-masing adalah (-68,29)-59,33 mg/dL, (-64,55)-63,30 mg/dL dan (-64,81)-62,88 mg/dL. Kadar LDL-C rumus Hopkins pada pasien DMT2 lebih banyak (69,85%) yang memenuhi TEa daripada rumus Sampson (67,65%) dan rumus Friedewald (60,30%). Nilai sensitivitas dan spesifisitas kadar LDL-C rumus Friedewald, Hopkins dan Sampson dengan kadar LDL-C metode *direct homogenous assay* pasien DMT2 pada *cut-off* LDL-C 70 mg/dL masing-masing adalah 87,50% & 94,23%, 81,25% & 96,15%, 87,50% & 95,19%.

Simpulan: Plot Bland Altman kadar LDL-C rumus Friedewald, Hopkins dan Sampson dengan metode *direct homogenous assay* pasien DMT2 memiliki kesesuaian akurasi yang baik tapi presisi kurang baik. Kadar LDL-C rumus Hopkins memiliki rerata selisih terkecil dengan metode *direct homogenous assay* dan paling banyak memenuhi TEa metode *direct homogenous assay* pada pasien DMT2. Nilai sensitivitas dan spesifisitas kadar LDL-C rumus Friedewald, Hopkins dan Sampson dengan kadar LDL-C metode *direct homogenous assay* pasien DMT2 pada *cut-off* LDL-C 70 mg/dL masing-masing adalah 87,50% & 94,23%, 81,25% & 96,15%, 87,50% & 95,19%.

Kata Kunci : *low density lipoprotein cholesterol*, rumus Friedewald, rumus Hopkins, rumus Sampson, diabetes melitus tipe 2

DIAGNOSTIC VALUE AGREEMENT OF FRIEDEWALD, HOPKINS AND SAMPSON FORMULA OF LOW DENSITY LIPOPROTEIN CHOLESTEROL LEVELS WITH DIRECT HOMOGENOUS ASSAY METHOD IN TYPE 2 DIABETES MELLITUS

ABSTRACT

Backgrounds: *Cardiovascular risk increases in T2DM so the patient have lower therapy target of LDL-C level. Direct measurement of LDL-C was recommended in T2DM due to Friedewald formula can underestimate LDL-C levels in low LDL-C and high triglycerides. Hopkins and Sampson formula have good accuracy in low LDL-C and high triglycerides. This study aims to determine agreement and diagnostic value of Friedewald, Hopkins and Sampson Formula of LDL-C levels with direct homogenous assay method in T2DM.*

Method*:An analytic study with a cross-sectional design was conducted on 136 subjects with T2DM at Dr. M. Djamil Hospital from May 2021 to February 2022. Low density lipoprotein cholesterol levels using Friedewald, Hopkins and Sampson formula were calculated from lipid profile measurement. Direct homogenous assay LDL-C also measured. The agreement analyzed with Bland-Altman Plot. Friedewald, Hopkins and Sampson formula LDL-C levels within allowable total error (TEa) requirement result calculated with direct homogenous assay as the standard. Sensitivity and specificity calculated from 2x2 table with cut-off LDL-C level <70 mg/dL.*

Result*:Mean difference Friedewald, Hopkins and Sampson formula with a direct homogenous assay are -4,48 mg/dL, 0,62 mg/dL and -0,96 mg/dL respectively. Friedewald, Hopkins and Sampson formula of LDL-C levels with a direct homogenous assay method have limit of agreement (-64,81)-62,88 mg/dL, (-64,55)-63,30 mg/dL and (-64,81)-62,88 mg/dL respectively. Hopkins formula of LDL-C level in T2DM within TEa requirement (69,85%) are more than Sampson (67,65%) and Friedewald (60,30%). Sensitivity and specificity Friedewald, Hopkins and Sampson formula of LDL-C levels in T2DM with LDL-C cut-off 70 mg/dL are 87,50% & 94,23%, 81,25% & 96,15%, 87,50% & 95,15% respectively.*

Conclusion: *Bland Altman Plot of Friedewald, Hopkins and Sampson formula of LDL-C levels with a direct homogenous assay method have good accuracy agreement but imprecise in T2DM. Hopkins formula of LDL-C level has the smallest mean difference with direct homogenous assay and has the most result within direct homogenous assay TEa requirement in T2DM. Sensitivity and specificity Friedewald, Hopkins and Sampson formula of LDL-C levels in T2DM with LDL-C cut-off 70 mg/dL are 87,50% & 94,23%, 81,25% & 96,15%, 87,50% & 95,15% respectively.*

Keywords: *low density lipoprotein cholesterol, Friedewald formula, Hopkins formula, Sampson formula, T2DM*