# INTISARI

**Latar Belakang:**
Infeksi saluran Kemih (ISK) merupakan salah satu jenis infeksi yang paling sering dijumpai. Prevalensinya terus mengalami peningkatan secara global. Bakteri adalah patogen tersering penyebab ISK. Berkembangnya cara deteksi karakteristik Gram menggunakan fitur *flagging* bakteri urinalisis metode *flow cytometry* dapat mempercepat keputusan pemberian antibiotik empiris pada pasien suspek ISK.
**Tujuan**:
Mengevaluasi kesesuaian jenis Gram antara hasil *flagging* bakteri urinalisis metode *flow cytometry* dengan kultur urin pada pasien suspek ISK.
**Metode**:
Penelitian ini menggunakan desain observasional analitik dengan pendekatan potong lintang. Subjek penelitian adalah pasien dewasa dengan keterangan klinis suspek ISK yang mengirimkan pemeriksaan kultur urin ke Laboratorium RSUP Dr. Sardjito sesuai kriteria inklusi dan eksklusi. Dilakukan pemeriksaan kultur urin dan urinalisis metode *flow cytometry* pada sampel urin tersebut. Analisis *Cohen's kappa* dilakukan untuk menilai kesesuaian jenis Gram antara hasil *flagging* bakteri urinalisis metode *flow cytometry* dengan kultur urin.
**Hasil**:
Sebanyak 137 subjek suspek ISK yang memenuhi kriteria terlibat dalam penelitian ini. Pemeriksaan urinalisis metode *flow cytometry* menunjukkan sebanyak 27 (19,7%) terdeteksi sebagai *flagging* Gram positif, 23 (16,8%) *flagging* Gram negatif, 28 (20,4%) *flagging* Gram *mixed*. Pengecatan Gram hasil pertumbuhan bakteri dari kultur urin menunjukkan sebanyak 11 (8%) terdeteksi sebagai Gram positif dan 50 (36,5%) masuk dalam kelompok Gram negatif. Berdasarkan pertumbuhan bakteri pada kultur urin, sebanyak 6 (54,5%) isolat Gram positif yang terdeteksi dari 11 hasil *flagging* Gram positif, sedangkan 17 (94,4%) isolat Gram negatif terdeteksi dari 18 hasil *flagging* Gram negatif. Hasil uji kesesuaian jenis Gram secara keseluruhan antara *flagging* bakteri urinalisis metode *flow cytometry* dengan kultur urin menunjukkan nilai *kappa* 0,338 (IK 95%: 0,217-0,460). Indeks *kappa* yang secara spesifik membandingkan hasil Gram positif pada kedua metode didapatkan sebesar 0,317 (IK 95%: 0,097 – 0,536), sementara pada hasil Gram negatif sebesar 0,660 (IK 95%: 0,476 – 0,844).
**Simpulan**:
Kesesuaian jenis Gram urinalisis metode *flow cytometry* dibandingkan kultur urin secara keseluruhan menunjukkan indeks *kappa* 0,338. Tingkat kesesuaian yang cukup baik didapatkan pada pemeriksaan *flagging* bakteri Gram negatif dengan indeks *kappa* 0,660.

**Kata kunci**: Infeksi Saluran Kemih, Gram Bakteri, Kultur urin, *Flow cytometry*

# *ABSTRACT*

**Background:**
Urinary tract infection (UTI) is among the most frequently seen infections, and its prevalence is rising worldwide. Bacteria are the most common pathogens responsible for UTIs. The advancement of bacterial Gram detection techniques through flow cytometry urinalysis, allows for prompt empirical antibiotic treatment of UTI patients.
**Objective:**
To evaluate the agreement of Gram type between Bacteria flagging of flow cytometry urinalysis and urine culture method.
**Method:**
This study design is observational analytic, featuring a cross-sectional method. The participants in the study are adult individuals suspected of having a UTI who submitted urine samples for urine culture tests to the laboratory of Dr. Sardjito General Hospital, meeting the inclusion and exclusion criteria. Urinalysis by flow cytometry and urine culture is performed using patient's urine sample. Flow cytometry method automatically characterizes bacterial Gram type displayed as Bacteria flagging feature. Agreement of Gram type between bacteria flagging of flow cytometry urinalysis and urine culture method will be analyzed using Cohen's kappa test.
**Result:**
A total of 137 subjects suspected of having a urinary tract infection (UTI) who met the inclusion criteria were involved in this study. Urinalysis bacterial flagging examination using the flow cytometry method revealed that 27 (19.7%) individuals were identified as Gram-positive, 23 (16.8%) as Gram-negative, and 28 (20.4%) as Gram-mixed. Gram staining of bacterial growth from urine culture indicated that 50 (36.5%) individuals fell into the Gram-negative category while 11 (8%) were identified as Gram-positive. According to bacterial growth observed in urine culture, 6 (54.5%) Gram-positive isolates were identified among 11 Gram-positive flagging results, while 17 (94.4%) Gram-negative isolates were identified from 18 Gram-negative flagging results. The overall agreement test for Gram type between bacterial flagging in urinalysis using flow cytometry and urine culture results showed a Cohen's kappa value of 0.338 (95% CI: 0. 0,217-0,460). The Cohen's kappa index for comparison limited to the Gram-positive group was 0.317 (95% CI: 0.097–0.536), while the test comparing only the Gram-negative group showed a moderate agreement with a Cohen's kappa index of 0.660 (95% CI: 0.476–0.844).
**Conclusion:**
The overall Gram-type bacterial analysis using bacterial flagging in urinalysis by flow cytometry, compared with urine culture, yielded a kappa index of 0.338. A higher level of agreement was achieved in the analysis of Gram-negative bacteria, with a kappa index of 0.660.
**Keywords:** Urinary tract infection, Bacterial Gram, Urine Culture, Flow cytometry