

*THE DIFFERENCE IN SODIUM LEVELS BETWEEN BLOOD TRANSFER
TECHNIQUES FROM SYRINGE TO TUBE WITH AND WITHOUT NEEDLE
REMOVAL*

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ABSTRACT

Background: *The pre-analytical phase is the most significant source of errors in laboratory examinations (60-70%), including the technique used to transfer blood from a syringe to a vacuum tube. Transferring blood by piercing the needle directly through the tube stopper can cause hemolysis due to high pressure and shear stress, which potentially increases sodium levels in the sample.*

Objective: *To determine the difference in sodium levels between blood transfer techniques from syringe to tube with and without needle removal.*

Methods: *This was an analytical observational study with a cross-sectional design. A total of 30 respondents were selected through random sampling at the Laboratory of Poltekkes Kemenkes Yogyakarta. Venous blood was collected using a 5 ml syringe and divided into two treatments: without needle removal (pierced into the stopper) and with needle removal (flowed through the tube wall). Sodium levels were measured using an ISE analyzer at RSUD Sleman. Data were analyzed using a parametric test (Paired T-test) or a non-parametric test (Wilcoxon test).*

Results: *The results showed that the average sodium level using the technique without needle removal (138.67 mmol/L) was lower compared to the technique with needle removal (139.42 mmol/L). Clinical analysis showed a mean difference (bias) of 0.537%. When compared to the international quality standard of Total Allowable Error (TEa) from CLIA ($\pm 4\%$), the deviation falls within the "Acceptable" category.*

Conclusion: *There is a statistically significant difference in sodium levels between blood transfer techniques without needle removal and with needle removal; however, clinically, the difference is still acceptable as it remains within the permitted error tolerance limits.*

Keywords: *Sodium, Blood Transfer, Needle Removal, Hemolysis.*

PERBEDAAN KADAR NATRIUM PADA TEKNIK TRANSFER DARAH SPUIT KE TABUNG DENGAN DAN TANPA PELEPASAN JARUM

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ABSTRAK

Latar Belakang: Tahap pra-analitik merupakan sumber kesalahan terbesar dalam pemeriksaan laboratorium (60-70%), salah satunya adalah teknik transfer darah dari spuit ke tabung vakum. Pemindahan darah dengan cara menusukkan jarum langsung ke tutup tabung dapat menyebabkan hemolisis akibat tekanan tinggi dan gaya geser (*shear stress*), yang berpotensi meningkatkan kadar natrium dalam sampel.

Tujuan: Mengetahui perbedaan kadar natrium pada teknik transfer darah spuit ke tabung dengan dan tanpa pelepasan jarum.

Metode: Jenis penelitian ini adalah observasional analitik dengan desain *cross sectional*. Sampel penelitian sebanyak 30 responden diambil secara *random sampling* di Laboratorium Poltekkes Kemenkes Yogyakarta. Darah vena diambil menggunakan spuit 5 ml, kemudian dibagi menjadi dua perlakuan: tanpa pelepasan jarum (ditusukkan ke *stopper*) dan dengan pelepasan jarum (dialirkan melalui dinding tabung). Pemeriksaan kadar natrium dilakukan menggunakan alat ISE di RSUD Sleman. Data dianalisis menggunakan uji statistik parametrik (uji *T-Paired*) atau non-parametrik (uji *Wilcoxon*).

Hasil: Hasil penelitian menunjukkan rata-rata kadar Natrium pada teknik tanpa pelepasan jarum (138,67 mmol/L) menunjukkan hasil yang lebih rendah dibandingkan dengan teknik pelepasan jarum (139,42 Mmol/L). Hasil analisis klinis menunjukkan nilai selisih (*bias*) sebesar 0,537%. Jika dibandingkan dengan standar mutu internasional *Total Allowable Error* (TEa) dari CLIA sebesar $\pm 4\%$, maka penyimpangan tersebut masih berada dalam kategori “Dapat Diterima” (*Acceptable*).

Kesimpulan: Terdapat perbedaan kadar natrium secara statistik antara teknik transfer darah tanpa pelepasan jarum dan dengan pelepasan jarum, namun secara klinis perbedaan tersebut masih dapat diterima karena berada dalam batas toleransi kesalahan yang diijinkan.

Kata Kunci: Natrium, Transfer Darah, Pelepasan Jarum, Hemolisis.