proceedings

MDPI

Abstract

The Validation of Smartphone-Based Point-of-Care Urinalysis Vivoo App †

Balım Bengisu Caf [1,2,*], Gizem Çebi [1,3], Haluk Çelik [1,4,*], Aliasghar Noroozi [1], Ali Atasever [1] and Miray Tayfun [1]

[1] Vivosens, Inc., 44 Tehama Street, Suite 409, San Francisco, CA, US 94105
[2] Department of Stem Cell and Tissue Engineering, Institute of Health Sciences, Istinye University, 34010, Istanbul, Turkey
[3] Program of Bioengineering, Graduate School of Science and Engineering, Yıldız Technical University, Esenler, Istanbul, 34220, Turkey
[4] Program of Chemical Engineering, Institute of Graduate School, Istanbul Technical University, ITU Ayazaga Kampusu, Maslak, Istanbul, 34469, Turkey
* Correspondence: haluk.celik@stu.istinye.edu.tr (HÇ); bengisu.caf@std.yildiz.edu.tr (BBC)
† Presented at 4th International Electronic Conference on Biosensors, 20-22 May 2024; Available online: https://iecb2024.sciforum.net/.

Abstract: Point-of-care (POC) analysis has become a crucial method for delivering fast and convenient medical diagnostics. The use of smartphone-based solutions further enhances the accessibility and convenience of POC, facilitating efficient analysis on the go. Integrating smartphone technology with POC has led to innovative applications like the Vivoo App, which enables users to conveniently monitor various health parameters. Our research aimed to confirm the accuracy and dependability of the Vivoo mobile application for urinalysis, using a comparative approach. We compared artificial urine samples analyzed through both the Vivoo app and traditional laboratory methods, assessing a wide range of health parameters. Throughout the study, we evaluated a total of 2618 strips using Vivoo. The results showed that these strips consistently matched the expected measurement results. Moreover, when we applied a ±1 color block acceptance criterion, 2608 out of 2618 measurements from the tested strips aligned perfectly with the expected results. Based on these findings, the 95% confidence interval for the exact match agreement proportion of Vivoo falls within 87.55% ± 1.27% and 99.62% ± 0.24%. Consequently, our study concludes that Vivoo is a reliable and high-performing device for wellness purposes. Its ability to provide precise and timely health insights holds great promise for improving individual health management, particularly in the context of smartphones' growing role in modern healthcare.

Keywords: Point of care; Urinalysis; Artificial Intelligence; Smartphone; Wellness; Healthcare.

Author Contributions: Conceptualization and methodology, B.B.C.; software, A.N., A.A; validation, G.C.; investigation, G.C.; writing—original draft preparation, H.Ç.; writing—review and editing, H.Ç., B.B.C., M.T.; visualization, G.Ç. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Informed Consent Statement: Not applicable for studies not involving humans or animals.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflict of interest.

Citation: To be added by editorial staff during production.

Academic Editor: Firstname Lastname

Published: date

References

1. Luppa PB, Müller C, Schlichtiger A, Schlebusch H. Point-of-care testing (POCT): Current techniques and future perspectives. *TrAC Trends in Analytical Chemistry*. 2011;30(6):887-898.
2. Trenti T. Synergy between point-of-care testing and laboratory consolidations. *Ejifcc.* 2021;32(3):328.
3. Lei R, Huo R, Mohan C. Current and emerging trends in point-of-care urinalysis tests. *Expert review of molecular diagnostics*. 2020;20(1):69-84.
4. Simerville JA, Maxted WC, Pahira JJ. Urinalysis: a comprehensive review. American family physician. 2005;71(6):1153- 1162

5. Queremel Milani DA, Jialal I. Urinalysis. [Updated 2022 May 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557685/
6. Kutter D. The urine test strip of the future. *Clinica chimica acta*. 2000;297(1-2):297-304.
7. Lepowsky E, Ghaderinezhad F, Knowlton S, Tasoglu S. Paper-based assays for urine analysis. *Biomicrofluidics.* 2017;11(5):051501.
8. Ventola CL. Mobile devices and apps for health care professionals: uses and benefits. *Pharmacy and Therapeutics*. 2014;39(5):356.
9. Baxter C, Carroll JA, Keogh B, Vandelanotte C. Assessment of mobile health apps using built-in smartphone sensors for diagnosis and treatment: systematic survey of apps listed in international curated health app libraries. *JMIR mHealth and uHealth*. 2020;8(2):e16741.