

The Accuracy of Household Spoons in Measuring Liquid Oral Medications in the Karapitiya Suburb

Madhushika I.W.H.[#], Jayasinghe M., Wijesekera K.A.K.D., Subasinghe H.W.A.S.
Department of Pharmacy, Faculty of Allied Health Sciences, University of Ruhuna, Sri Lanka

[#]*Corresponding author: madhushika0824@gmail.com*

Background: Household spoons, with their diverse sizes, shapes, and volumes, are commonly used for administering liquid medications, potentially causing dose variations.

Objective: To investigate the accuracy of household spoons in measuring oral liquid medications

Methods: Teaspoons (n=45) and tablespoons (n=15) were gathered from homes in Karapitiya using convenient sampling method. The volumes of spoons were measured by two methods; the weighing method and the volumetric method. In the weighing method, volume (v) was calculated using $v=m/\rho$, and in the volumetric method, using graduated cylinders. Deviations, $\geq 10\%$ of the measured volume from the expected volume were considered to fail the accuracy test (USP specifications). Independent sample t-test was used for comparison of measured volumes with expected volume and $p < 0.05$ was considered statistically significant.

Results: In the weighing method, 93.3% of tablespoons had lower and 6.67% had higher volume than the anticipated volume and 20.0% of the samples satisfied the USP requirements. In the volumetric method, 80.0% of tablespoons had lower volumes, 6.67% had higher volumes, and 13.3% were in the same volume. Among them, 26.67% fulfilled the USP standards. Further, results of the weighing method showed that 93.33% and 6.67% teaspoons, had lower and higher volumes than the expected volume respectively. Only 8.89% of the sample satisfied the USP criterion. According to the volumetric method, 91.10% of teaspoons had less volume, 4.40% had higher volume than the anticipated volume, and 4.40% were equal to 5.00mL. Also, 22.2% of teaspoons met the USP standards. In both the weighing and volumetric methods, there were significant differences between volume measured with tablespoons (weighing method: 9.00 ± 3.39 mL; volumetric method: 9.70 ± 3.45 mL, $p \leq 0.001$), and teaspoons (weighing method: 4.02 ± 0.97 mL; volumetric method: 4.00 ± 0.83 mL, $p \leq 0.001$) and their expected volumes.

Conclusion: Volumes of household spoons are inaccurate and inappropriate to measure oral liquid medications. Accurate dosing devices should be used for administering medications.

Keywords: *Dosing, Medication errors, Tablespoons, Teaspoons, Volumetric method, Weighing method*