# Diagnostic performance of Transrectal ultrasound for Prostate volume estimation in Men with Benign Prostate Hyperplasia

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**Abstract**

Background and Aim: Despite transrectal ultrasound (TRUS) being regarded as gold-standard for prostate volume estimation, concerns have been raised in literature concerning its accuracy especially in men with above-average prostate volumes. We aimed to evaluate the performance of TRUS for prostate volume estimation in a cohort of sub-Saharan African men since they are known to have relatively large mean prostate volumes. Methods: This was a prospective study of 77 sub-Saharan African men who had open simple prostatectomy for Benign Prostate Hyperplasia (BPH). Pre-operative TRUS determined total prostate volume (TPV) and transition zone volume (TZV). Following surgical enucleation, the adenoma was weighed (EPW) and its volume (EPV) also determined by fluid displacement. TRUS was repeated six weeks post-operatively to calculate the TRUS-estimated specimen volume (TESV). Results: The mean EPV, EPW, TRUS-estimated TZV, TRUS-estimated TPV and TESV were 79.1 ± 62.9mls, 79.1 ± 62.9g, 53.3 ± 28.5mls, 93.1 ± 48.9mls and 69.9 ± 44.6mls respectively. Pearson's correlation showed perfect relationship between EPW and EPV with no difference in their mean values (r=1.000; P<0.001). Pearson's correlation between TRUS-estimated TPV vs EPV, TRUS-estimated TZV vs EPV, and between TESV vs EPV were 0.932, 0.865 and 0.930 respectively (p = 0.0000). TRUS significantly under-estimated the TZV and TESV by 25.8ml and 9.2ml respectively; unrelated to severity of prostate enlargement. Conclusion: TRUS underestimates prostate volume, independent of prostate size. We propose simple formulae that could be used to improve the prostate volume determination from TRUS, especially if magnetic resonance imaging is not readily available or contraindicated.

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## RUNNING TITLE: Determination of prostate volume

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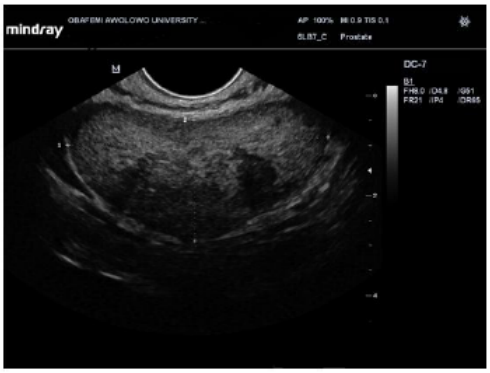
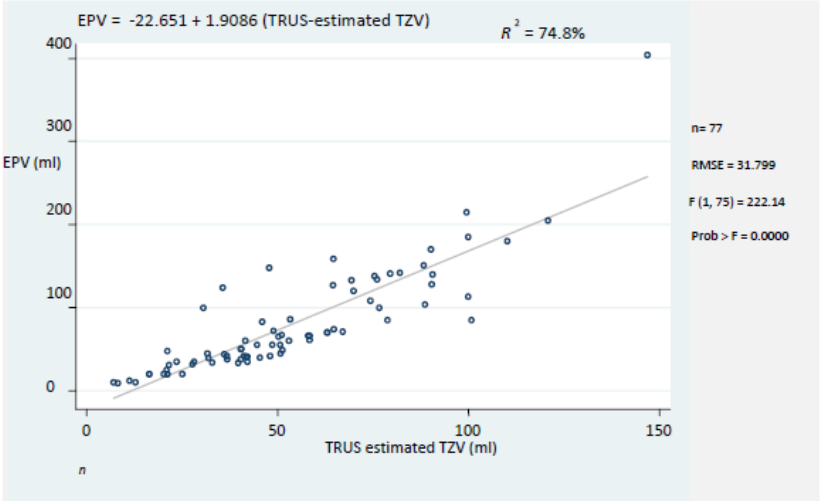
**Figure 1: Selected axial and sagittal prostate images from TRUS**

**A): Axial image with well circumscribed transitional zone in central portion**



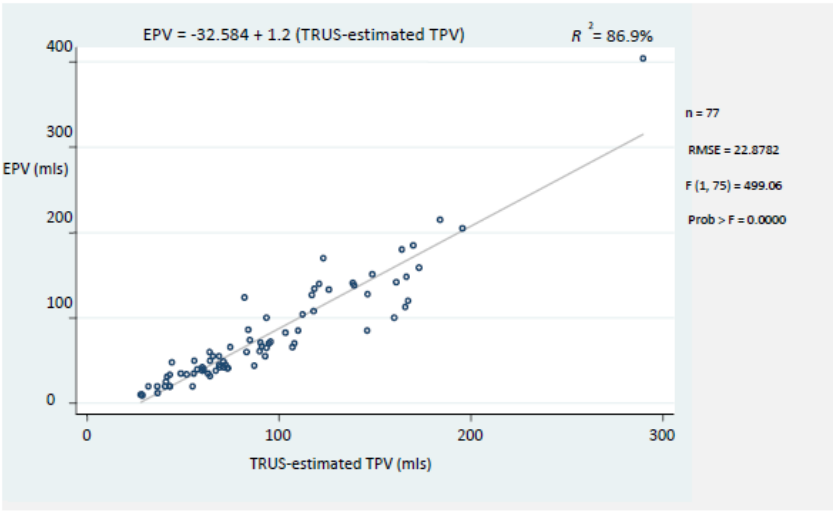

**B): Sagittal image with well circumscribed transitional zone (TZ) in central portion and prominent median lobe indenting on bladder**

**Figure 2:** **Scatter diagram showing relationship between Enucleated prostate volume and TRUS-estimated transition zone volume**




EPV = Enucleated prostate volume; TZV = Transition zone volume, TRUS = Transrectal ultrasound

**Figure 3:** **Scatter diagram showing relationship between Enucleated prostate volume and TRUS-estimated total prostate volume**




EPV = Enucleated prostate volume; TPV = Total Prostate Volume, TRUS = Transrectal ultrasound