Comparison Of Manual Vs Automated (SQA Vision) Semen Analysis: A Double Blind Prospective Study

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❖ **Manual semen analysis** suffers from **analytical variability** & **subjective variation**.

❖ Manual assessment of sperm morphology is associated with difficulties related to **lack of objectivity, variation in interpretation** or poor performance in external quality-control assessments.

❖ To **compare an automated computerized semen analysis system (SQA-Vision) to the conventional manual method** in terms of **accuracy and precision**.

❖ **Type of study:** Prospective (Double blind), analytical

❖ Conducted in **Division of Clinical Microbiology** and Molecular Medicine, Department of **Lab Medicine, AIIMS**, New Delhi between **July- September 2016**.

❖ **250 fresh semen samples were tested by both, manual method & SQA-Vision, in duplicate** at room temperature.

❖ **Manual testing** was done by **2 independent operators** & 1 manual operator ran **SQA-Vision immediately following the manual analysis** of motility to **prevent bias**.

❖ **Sperm concentration, total and progressive motility & morphology** were assessed according to the **5th WHO semen testing laboratory manual, 2010**.

❖ Statistical analysis of data was done using **MedCalc (Belgium) and Excel programs.**

❖ Comparison of the **SQA-Vision & manual results** is presented in the table 1 below**.**

## Table 1: Comparison of SQA-Vision & manual results of semen analysis

Statistical Parameters		Semen Parameters			
		Sperm Conc.	Total Motile PR + NP	Progressive PR	Morph. Normal Forms
SQA-Vision	Mean (x10⁶/ml)	45.4	30.0	20.8	6.4
	CV, %	3.1	5.6	4.4	5.3
Manual	Mean, x10⁶/ml	46.3	35.0	24.5	7.7
	CV, %	11.0	14.0	19.6	17.8
Sensitivity (%)		100.0	95.2	95.9	100.0
Specificity (%)		99.3	89.6	85.0	98.9
Concordance Correlation		0.97	0.84	0.86	0.84
Pearson Correlation		0.97	0.87	0.89	0.89
Bias Correction (accuracy)		1.0	0.96	0.97	0.95

❖ CVs for SQA-Vision are much lower than for manual analysis which demonstrates that SQA-Vision's precision is higher.

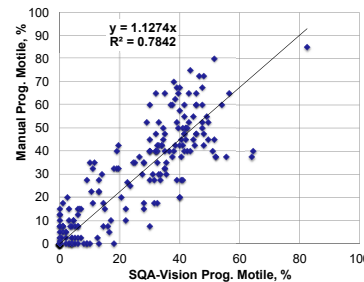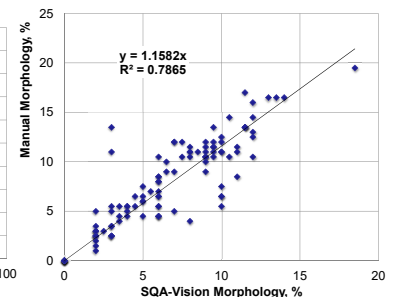
Fig 1. Sperm Concentration
y = 1.0009x
R² = 0.9358
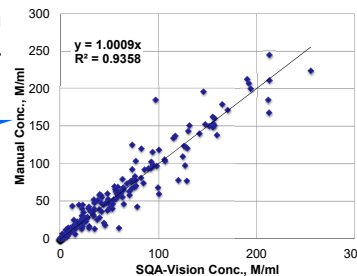
Fig 2. Sperm Total motility
y = 1.123x
R² = 0.7533
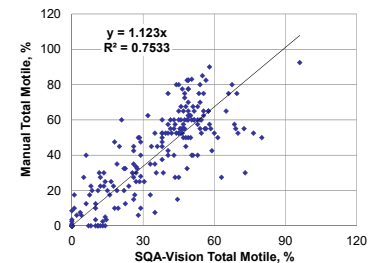
Fig 3. Progressive motility
y = 1.1274x
R² = 0.7842

Fig 4. Sperm Normal Morphology
y = 1.1582x
R² = 0.7865

❖ **SQA-Vision & manual** semen parameters' **mean values are quite close** demonstrating **no systematic discrepancies.**

❖ **Sensitivity, specificity, concordance & correlation coefficients are very high** indicating a high level of **accuracy & close agreement** between the 2 methods.

❖ **Bias correction coefficients** are between **0.95 & 1.0** for different semen parameters showing a high level of agreement.

❖ The automated semen analyzer **SQA-Vision is faster** and provides a **higher level of standardization** and **precision vs. manual semen assessment**.

❖ The simplicity of operating the automated SQA-Vision **minimizes the need for highly skilled professionals**.