

Abstract citation ID: deac104.109

P-038 Comparison of three methods of semen analysis: A novel at-home sperm test kit, a computer-assisted assessment and an embryologist

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Study question: How does computer-assisted semen analysis (CASA) (Lenshooke, LOGIXX) and at-home sperm testing (ExSeed) compare with manual methodology assessment of male fertility based on WHO criteria (5th Edition); a three-method comparison study.

Summary answer: All methods showed good agreement for concentration and limited agreement for motility highlighting the need for further development of alternatives to manual assessment.

What is known already: Several studies have shown good correlation between CASA systems and laboratory-based manual semen analysis, but only a few have carried out a three-way comparison study. One of which showed positive correlation with motility and concentration between a smartphone-based semen analysis and laboratory-based CASA system and positive correlation between concentration and motility between the smartphone-based CASA system and microscopic-based results. The at-home sperm test kit may play a role in motivating infertile males to visit clinics for early diagnosis and also reducing the need for multiple visits to the fertility clinic for repeat semen analyses.

Study design, size, duration: Fifty patients (between 29 and 56 years) attending a fertility clinic were included in the study between September 2021 to December 2021. Semen samples were split into 3 aliquots and evaluated using manual semen assessment (MSA) according to the WHO 5th Edition (2010) guidelines, the ExSeed Home Sperm Test (HST) and the LensHooke[®] XI PRO Semen Quality Analyzer (CASA).

Participants/materials, setting, methods: The semen samples were collected from fifty participants at CARE Fertility Tunbridge Wells. The samples were placed in an incubator at 37°C for 30 minutes to liquefy. After liquefaction, sperm concentration, total motility, total motile sperm count (TMSC) and normal morphology were evaluated. Spearman's Rank correlations (>0.7) and Chi-squared tests were used and the p-value < 0.05 was considered as statistically significant.

Main results and the role of chance: All variables were highly significantly ($p < 0.0002$) positively correlated between all 3 methods.

The greatest correlations were obtained for sperm concentration (CASA/HST: $r = 0.826$; MSA/HST: $r = 0.870$; MSA/CASA: $r = 0.871$) and TMSC (MSA/CASA: $p = 0.792$; CASA/HST: $r = 0.800$; MSA/HST: $r = 0.854$). Correlations for motility were markedly lower (MSA/HST: $r = 0.611$; CASA/HST: $r = 0.717$; MSA/LCASA: $r = 0.750$). The lowest correlation was found for morphology (MSA/CASA: $r = 0.500$). The HST device does not determine morphology.

As compared to MSA, using the HST device agreement for normal or low sperm concentration ($\geq 15 \times 10^6/\text{mL}$ or $< 15 \times 10^6/\text{mL}$ respectively) was identified in 84.3% of the cases, whereas 94.0% with CASA. The agreement between CASA and HST was 82.0%. For total motility \geq or $<$ 40%, the agreements were 68.0% (CASA/HST), 56.9% (MSA/HST) and 82.0% (MSA/CASA), respectively.

For the identification of patients with normal morphology >4%, the agreement between MSA and CASA was 30%.

Limitations, reasons for caution: The small sample size was 50 cases. The home testing device does not assess morphology. Furthermore, it is difficult to ascertain whether a consumer would carry out the analysis with this device with the same accuracy as an embryologist.

Wider implications of the findings: The need for repeated semen analyses, the effect of the COVID-19 pandemic and the discomfort some patients feel in a clinical setting, necessitate the need for evaluation of novel semen analysis approaches. These emerging technologies have potential to be more patient friendly, convenient and efficient than standard semen assessment methods.

Trial registration number: not applicable