The fickleness of data: Estimating the effects of different aspects of acupuncture treatment on heart rate variability (HRV). Initial findings from three pilot studies

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Background

Heart rate variability (HRV) is a measure of the interplay between sympathetic and parasympathetic influences on heart rate. Higher HRV is usually associated with relaxation and health benefits, lower HRV with stress/pathology. HRV is used increasingly in acupuncture research.

Electroacupuncture (EA) and transcutaneous electrical acupoint stimulation (TEAS) are frequently used variants of manual acupuncture (MA).

Methods of assessing effect

HRV values

Changes in HRV values
Correlations between HRV values

Ratios of 'high' or 'low' HRV values relative to group median

Normalised percentage difference (Diff%) between values:

\[
\text{Diff} = \frac{(\text{Value at } 10 \text{ Hz}) - (\text{Value at } 2.5 \text{ Hz})}{(\text{Value at } 2.5 \text{ Hz})} \times 100
\]

Coefficient of variance (CV), a measure of dispersion
Cohen's d (effect size)
Correlation ratio et al (r)
Counts of significant differences (N)

Conclusions

There is excellent correlation between assessment methods.

The sum of r² for all factors (~effect size) = 0.678, suggesting that >2/3 of factors responsible for variance in outcomes have been identified.

The analytical methods employed here are accessible even to those with little statistical expertise. They offer a simple way of assessing the contribution of different experimental factors to outcomes when statistical significance is elusive and sample size is small. They would thus be very appropriate in acupuncture research, which tends to involve a number of independent variables in small-scale studies.

Where next?

The next small-scale Pilot in this study will focus on individual participants, within individual sessions, and with stimulation at a single location (LI4 or ST36) within each session, rather than attempting to compare the effects of several variables at once. Careful attention will be paid to the effects of baseline HRV (B) and stimulation Amp, as well as Hz. A mixed models approach and multivariate analysis will also be used to analyse new and existing results, with Bootstrap to ensure a sufficiently large sample size.

Further information available at www.qeeg.co.uk/electroacupuncture/hrv1.htm, also accessible through the QR code at the head of this poster.