Scope.
The analysis covers the determination of the relationship between all 3 test scores; the Warwick-Edinburgh Mental Well-Being Scale 0 – 70 (WEMWBS), the General Anxiety Disorder score 0 – 21 (GAD-7) and the Patient Health Questionnaire score 0 – 27 (PHQ-9).

The search found 955 patients with either a WEMWBS, a GAD-7 or a PHQ-9 score. Of these, 242 patients have both WEMWBS & PHQ-9 scores; 184 have both WEMWBS & GAD-7 scores; 213 have both GAD-7 & PHQ-9 scores and 172 with all three.

The sample size used for each comparison was 75 patients (not necessarily the same 75); there is scope for ‘fine tuning’ the relationships by using larger sample sizes.

In the formulae below, WEMWBS is denoted by ‘W’, GAD-7 by ‘G’ & PHQ-9 by ‘P’.

Results.
- Relationship between WEMWBS scores and PHQ-9 scores.

![Graph showing relationship between WEMWBS and PHQ-9 scores]

Comments.
It will be seen that an inverse relationship exists between the WEMWBS scores and the PHQ-9 scores; the higher the WEMWBS score, the lower the PHQ-9 score for each patient. (An inverse relationship will also be seen between the WEMWBS scores and the GAD-7 scores.

The mean WEMWBS score was 39.6 & the mean PHQ-9 score was 11.5.
The general relationship between a patient’s WEMWBS score & their PHQ-9 score is as the following formula: \[ W = 54.82 - 1.254P \]
e.g. PHQ-9 score =11.5, WEMWBS score = 54.82 – (11.5 x 1.254) = 54.82 – 14.42 = 40.4

The error when using this formula, and the other two formulae covering the other relationships, for calculating equivalent scores is estimated at ± 2.5%.
Results (cont.)

- Relationship between WEMWBS scores & the GAD-7 scores.

![Graph showing relationship between WEMWBS and GAD-7 scores]

Comments.
The mean WEMWBS score was 39.6 & the mean GAD-7 score was 11.0 (PHQ-9 was 11.5). The general relationship between a patient’s WEMWBS score & their GAD-7 score is as the following formula:

\[ W = 51.83 - 1.114G \]

- Relationship between PHQ-9 scores & the GAD-7 scores.

![Graph showing relationship between PHQ-9 and GAD-7 scores]

Comments.
The mean GAD-7 score was 11.0 and the mean PHQ-9 score was 11.23.
The general relationship between a patient’s PHQ-9 score & their GAD-7 score is as the formulae:

\[ P = 0.842G + 1.9701 \]  

i.e. when \( G = 21 \), \( P = 19.7 \).
The relationship formulae derived from the two WEMWBS comparisons is:

\[ P = 0.888G + 2.384 \]  

i.e. when \( G = 21 \), \( P = 21.0 \).

Conclusion.
Although the PHQ-9 scale has a score up to 27 & the GAD-7 a score up to 21, this analysis would indicate that both the PHQ-9 & the GAD-7 yield the same outcome & score. Calculating \( \chi^2 \) between PHQ-9 of 19.7 & GAD-7 of 21.0 shows a probability of association of 99%.