LETTER TO THE EDITOR

Interpretation of correlation coefficients

A recently published article by Ko et al[1] illustrates a commonly encountered problem with the interpretation of correlation coefficients in medical research. The authors stated the correlation coefficient ranged from -0.002 to 0.15. If the P value was greater than 0.05, they interpreted the findings as indicating no correlation. Otherwise, there was weak correlation. The *t* value of the correlation coefficient was given by:

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$

where *r* is the correlation coefficient and *n* the sample size.[2]

From this we can infer that if the sample size or correlation coefficient increases, so will the *t* value, and hence P value will decrease and thus tend to increase statistical significance. Thus, if there is a huge sample size, the result will be significant even when there is very weak association. However, if the sample size is small, the result will remain non-significant even though the correlation coefficient is large. Theoretically, if the sample size approaches infinity, the test will always be highly significant (P<0.0001) though the correlation coefficient tends to zero.

So the P value for the correlation coefficient just tells us whether the coefficient is or is not reliable, it cannot determine whether there is correlation between two factors. For example, in the article referred to, for *r*=0.15 and P=0.003, we should interpret as "the correlation coefficient is reliable and there is weak correlation between two factors". In another example with *r*= –0.002 and P=0.97, we should interpret as "there is no adequate evidence to show whether two factors are correlated or not" rather than "they are not correlated" as stated in the article.

KC Wong, FHKAM (Psychiatry)
Email: wongkc05@hotmail.com
Department of Psychiatry
Pamela Youde Nethersole Eastern Hospital
Chai Wan
Hong Kong

References

1. Ko FW, Chan AM, Chan HS, et al. Are Hong Kong doctors following the Global Initiative for Asthma guidelines: a questionnaire "Survey on Asthma Management"? Hong Kong Med J 2010;16:86-93.
2. Armitage P, Berry G, Matthews JN. Statistical methods in medical research. 4th ed. Massachusetts: Blackwell Publishing; 2002: 199.

Answers to CME Programme
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I. Are Hong Kong doctors following the Global Initiative for Asthma guidelines: a questionnaire "Survey on Asthma Management"?

A	1. True	2. True	3. True	4. True	5. False
B	1. True	2. False	3. False	4. True	5. False

Hong Kong Med J 2010;16:94–100

II. Management of primary spontaneous pneumothorax in Chinese children

A	1. True	2. False	3. True	4. False	5. True
B	1. True	2. True	3. False	4. True	5. False