

FACTORS INFLUENCING CARDIAC AUSCULTATION PROFICIENCY IN PHYSICIAN TRAINEES

Dear Sir,

I enjoyed reading the original article entitled “Factors influencing cardiac auscultation proficiency in physician trainees” that was published in the January 2005 issue of the Singapore Medical Journal⁽¹⁾. It was interesting and had potentially important implications for the continuing medical education of family physicians like myself. However, there is some statistical nit-picking I would like to do. The points I would like to raise are as follows (with quotes from the article in italics):

1. *Physicians who graduated in 1994 or earlier fared significantly poorer than those who obtained their (MBBS) degrees between 1995 and 2000, p-value = 0.02.* The mean auscultatory scores concerned are 3.7 (out of 10) for the more seasoned doctors and about 4.5 for the more recently graduated ones. That is, the average difference in skill between the two groups is roughly equivalent to the ability to identify one particular cardiac sound out of ten. While statistically significant, I am not convinced that this is of clinical significance.
2. *Our data suggest that cardiac auscultation skill declined with time.* If this were true, we would expect to see a steady decline in the mean auscultatory scores with time from graduation. The data does not show this. Instead, it shows the mean score rising to a peak with those who graduated in 1997-1998, before declining to the lowest mean score in those who graduated before 1994. Furthermore, the “before 1994” group presumably encompasses a wider time span than the other groups, and hence cannot be meaningfully compared with them. The point here is not that the conclusion is wrong – it sounds intuitive and may well be correct – rather it is that the data, taken as a whole, do not support this particular conclusion.
3. The idea that the apparent decline in auscultatory skill with time was due to lower level of exposure to abnormal heart sounds was mentioned, together with the idea that continuing medical education could counteract this. Alternative hypotheses, however, were not examined. For example – could the older doctors simply have had poorer hearing than the younger doctors? This factor certainly affects me – I may need a hearing aid as well as CME! Another alternative hypothesis: younger doctors had exposure to newer, better teaching methods – perhaps even the very electronic stethoscope used in this study.
4. The “abnormality” of tachycardia was identified by a minority of doctors (6.6% - compared to the 17.9% to 79.2% accuracy rate for the other heart sounds / murmurs). Such a statistical “outlier” surely warrants a closer look – was the recording of that particular heart sound poor? Perhaps we so frequently have to auscultate nervous, tachycardic patients in cold examination rooms that we have simply forgotten that tachycardia is an abnormality.

Incidentally, it would certainly be interesting to see how a cardiologist scored with the same device and the same recordings. Even without formal statistical analysis, this piece of information would allow us to get some perspective as to how bad (or good) the mean score of the doctors involved in the study really were.

Yours sincerely,

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REFERENCE

1. Lam MZ, Lee TJ, Boey PY, Ng WF, Hey HW, Ho KY, et al. Factors influencing cardiac auscultation proficiency in physician trainees. Singapore Med J 2005; 46:11-4.

AUTHORS' REPLY

Dear Sir,

We thank Dr Loong for his interest in our article and appreciate the questions that he has raised.

In response to the statement that the difference in mean auscultatory scores between the more seasoned doctors and the more recently-graduated ones may not be of clinical significance because of the small perceived difference (one cardiac sound out of ten), we would say, on the contrary, that the difference is clinically important. In the context of low mean scores of 3.7 and 4.5, translated into a failure to identify six and five cardiac sounds, respectively, out of ten by the two groups, an improved ability to identify just one extra cardiac sound actually becomes significant in minimising diagnostic errors and their consequences⁽¹⁾.

Concerning the comment on the apparent peaking of the mean score for doctors who graduated in 1997-1998, we would like to point out that there is no statistically significant difference in mean scores among the groups from any of the three time periods of 1999-2000, 1997-1998, and 1995-1996 (see Table I). Hence, the three time periods could be treated as one, i.e. 1995-2000, which was appropriately done in our article. On the other hand, there was a statistically significant difference in mean scores between the "before 1994" and "after 1994 (i.e., 1995-2000)" groups. Hence, our conclusion of a decline in auscultation skill with "time" remains valid⁽¹⁾.

We cannot agree with the statement that because of our conclusion, one should see a gradual decline in the mean auscultatory scores with time from graduation. This, we must say, is an assumption which is not supported by clinically relevant data. We certainly know of many trends that follow the exponential rather than the gradual curve. We also cannot agree with the reader's argument that one cannot compare two groups with different time spans, a statement not supported by any statistical rule that we are aware of.

While relevant, we do not think that hearing impairment is a significant confounder in the study for the following reasons. Firstly, most of the participants in this Family Medicine training programme were in their 30s and 40s, and would most unlikely be affected by age-related presbycusis. Secondly, the participants in the study were allowed to turn up the volume of the electronic stethoscope as they wished, so the issue of needing another hearing aid does not arise. Lastly, the survey results at the end of the study indicated that the cardiac sounds were of a quality acceptable to the participants, and this provides the best evidence against sound quality and quantity being a major confounder.

With regard to the alternative hypothesis raised that younger doctors had exposure to newer teaching methods, we do not think this is relevant since our team, which includes the Director of Undergraduate Education at the Department of Medicine, National University of Singapore, is not aware of any fanciful tools being introduced for auscultation teaching to medical students at NUS or overseas in recent times. The electronic stethoscope was used only once on a research basis during the SARS outbreak⁽²⁾. We concede that the electronic stethoscope is not the best means for testing of tachycardia as a normal variant. Often, clinical correlates are necessary, and being absent in our study, could result in the low accuracy rate of this particular cardiac sound.

We are grateful to Dr Loong for his suggestion of scoring the same cardiac sounds on a group of cardiologists and agree the results will be most useful. This will certainly be an interesting research question that merits further study.

Yours sincerely,

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1. Lam MZ, Lee TJ, Boey PY, Ng WF, Hey HW, Ho KY, et al. Factors influencing cardiac auscultation proficiency in physician trainees. *Singapore Med J* 2005; 46:11-4.
2. Lam CSP, Cheong PY, Ong BK, Ho KY. Teaching cardiac auscultation without patient contact. *Med Educ* 2004; 38:1184-5.