

LETTER

Keeping our feet firmly on the ground: a reply to Eyal Shahar

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Accepted for publication: 16 October 2011

To the Editor

I would like to thank Eyal Shahar for the review of my book for the *International Journal of Person Centered Medicine* [1]. He has spent a considerable amount of time preparing his text and for this I am grateful. There are, however, a number of points raised in his review with which I wish to take issue.

In the preface to the book [2], I asked how confident we should be with the product of statistics-based research. Shahar replies that, “We should have no confidence in any type of evidence...” Does this mean, for example, that he doubts that insulin lowers blood sugar, that atropine dilates the pupil or that adrenaline produces tachycardia and hypertension? When he watches the intravenous administration of powerful antibiotics to someone with septicaemia, does he shake his head in despair and argue that prayer would be better? And, if he had a perforated colonic diverticulum, would he toss a coin to decide whether to sign the consent form for laparotomy?

Shahar takes his argument a stage further. Such doubts about medical research, he says, apply equally to science in general. The best that we may expect is “conjectural knowledge” – as opposed to “true knowledge” which, we must assume, is confined to analytical or logical truths. If this is his stance, so be it. But it will do him little good in his dealings with the natural world.

As far as Shahar is concerned, all empirical knowledge is conjectural – whether from experiments in the physical sciences or from statistical studies in medical research. Not only that, but all knowledge of things and events in the world around us is somehow second-rate and this applies equally to these two extreme circumstances. No distinction is made.

But this blurs a huge difference. Water boils at 100°C at sea level. If this is not knowledge – if this is not *unqualified* knowledge – then what is knowledge? Does anyone doubt the generalisation relating to the temperature at which water boils? Aren't we all sure that it is utterly reliable? Don't we all feel confident about predicting that the phenomenon will recur again and again? How would

Shahar react to someone who denied it? Has anyone ever demonstrated it to be false? Has Shahar ever considered that it might be untrue? Of course not. Now, contrast that with the generalisations derived from statistics-based research – in other words, large-scale randomised trials and epidemiological studies often involving tens of thousands of participants. For example, from the demonstration of a small, statistically significant difference in outcome between those receiving active treatment and the placebo control group, it is claimed that the drug reduces mortality from heart attacks. But applying the same label – conjectural knowledge – to both situations doesn't make our confidence in the two generalisations any more alike. It doesn't hide the fact that we will rely on the truth of the first but we would be very cautious of putting our faith in the second.

The point is that, as I argued in *Stats.con* [2], there is a spectrum of evidence in medicine. We must remember that there is a world of difference between minor deviations from strict regularity between the cause and the effect and the obscure relevance of trivial differences observed in statistical studies to causal inference.

As a Professor in a Department of Epidemiology and Biostatistics, I can understand Shahar's leaning towards statistical research and his preference for indeterminism, although I do not agree with him on either matter. Nor can I agree that “... a cause does not increase the probability of its effect” – such an assertion flies in the face of much of the literature on probabilistic causation. And I have little sympathy with the idea that all of our knowledge about the natural world is conjectural. Adding salt to pure water lowers the freezing point. This generalisation always has been true and continues to be true. It may easily be tested under experimental conditions. The outcome is predictable. Of course, if we wish, we may doubt these statements and relegate the status of this generalisation to some kind of imperfect knowledge. But what is there to be gained by such indulgences? They are nothing but empty gestures or the musings of a wannabe Descartes.

Research in medicine, as elsewhere, is all about identifying causal relationships. This allows us to change

the world around us – to promote those things that are of benefit to us and to prevent those that are disadvantageous. Causation is a practical matter. We must keep our feet firmly on the ground and avoid being led astray. This is really what *Stats.con – How we've been fooled by statistics-based research in medicine* is all about [2].

References

- [1] Shahar, E. (2011). Research and medicine: human conjectures at every turn. *International Journal of Person Centered Medicine* 1 (2), 250-253.
- [2] Penston, J. (2010). *Stats.con – How we've been fooled by statistics-based research in medicine*. London: The London Press.