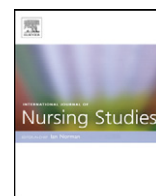




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Effect of improving the realism of simulated clinical judgement tasks on nurses' overconfidence and underconfidence: Evidence from a comparative confidence calibration analysis

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ABSTRACT

Background: Apparent overconfidence and underconfidence in clinicians making clinical judgements could be a feature of evaluative research designs that fail to accurately represent clinical environments.

Objectives: To test the effect of improved realism of clinical judgement tasks on confidence calibration performance of nurses and student nurses.

Design: A comparative confidence calibration analysis.

Settings: The study was conducted in a large university of Northern England.

Methods: Ninety-seven participants rated their confidence – using a scale that ranged from 0 (no confidence) to 100 (totally confident) on dichotomous clinical judgements of critical event risk. The judgements were in response to 25 paper-based and 25 higher fidelity scenarios using a computerised patient simulator and clinical equipment. Scenarios, and judgement criteria of 'correctness', were generated from real patient cases. Using a series of calibration measures (calibration, resolution and over/under-confidence), participants' confidence was calibrated against the proportion of correct judgements. The calibration measures generated by the paper-based and high fidelity clinical simulation conditions were compared.

Results: Participants made significantly less accurate clinical judgements of risk in the high fidelity clinical simulations compared to the paper simulations ($P=0.0002$). They were significantly less confident in high fidelity clinical simulations than paper simulations ($P=0.03$). However, there was no significant difference of over/under-confidence for participants between the two simulated settings ($P=0.06$). Participants were no better calibrated in the high fidelity clinical simulations than paper simulations, $P=0.85$. Likewise, participants had no better ability of discriminating correct judgements from incorrect judgements as measured by the resolution statistic in high fidelity clinical simulations than paper simulations, $P=0.76$.

Conclusions: Improving the realism of simulated judgement tasks led to reduced confidence and judgement accuracy in participants but did not alter confidence calibration. These findings suggest that judgemental miscalibration of confidence in nurses may be a systematic cognitive bias and that simply making scenarios more realistic may not be a sufficient condition for correction.

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What is already known about the topic?

- In clinical judgement, the ability of clinicians to match confidence to their judgemental abilities is a crucial link in the delivery of quality healthcare. Nurses' overconfidence and underconfidence in their clinical judgements have been demonstrated in some empirical studies.
- Almost all the clinical confidence calibration studies noted thus far used paper cases to represent clinical judgement tasks. However, their use as the cornerstone of much work in examining clinical judgement can be questioned, due to a lack of case fidelity (the degree of similarity between real situations and simulated situations).
- Therefore, apparent overconfidence and underconfidence in nurses making clinical judgements could be a feature of evaluative research designs that fail to accurately represent clinical environments.

What this paper adds

- This study investigates whether improving the realism of clinical scenarios impacts on nurses' over/underconfidence in their risk assessment judgements, and tests the hypothesis that clinicians' confidence miscalibration could be attributable to an experimental design that does not fully capture the 'realism' of real environment.
- The findings showed that improving the realism of simulated judgement tasks led to reduced confidence and judgement accuracy in participants but did not alter confidence calibration.
- These findings suggest that nurses' judgemental miscalibration of confidence may be a systematic cognitive bias and that simply making scenarios more realistic may not be a sufficient condition for correction.

1. Introduction

In clinical judgement, the ability of clinicians to match confidence to their judgemental abilities is a crucial link in the delivery of quality healthcare; it is often lacking (Baumann et al., 1991). The relationship between confidence and judgement success is known as calibration of confidence. In most calibration studies, confidence is often measured using a continuous scale of between 0 and 100 assigned by the judge on a particular judgement. Overconfidence is characterised by a positive score when the judge's mean confidence exceeds the mean judgement accuracy, whilst underconfidence is characterised by a negative score when the judge's mean judgement accuracy exceeds the mean confidence. Miscalibration such as overconfidence or underconfidence when making judgements and decisions is an important form of bias in reasoning (Lichtenstein and Fischhoff, 1980, 1982; Petrusic and Baranski, 1997). Overconfidence in one's clinical judgement performance can increase the risk of iatrogenic harm (Croskerry and Norman, 2008). In the medical area of critical event risk assessment, overconfidence can result in delayed action (or worse, doing nothing) in the face of clinical data that merit an immediate response of intervention.

Much of previous medical research has demonstrated doctors' overconfidence phenomenon in their clinical judgements. For example, the study by Hausman et al. (1990) evaluated the over/underconfidence of a group of paediatric residents on their results of multiple choice examinations. This study showed a significant association between an increased level of overconfidence and lower examination scores, with a tendency for residents to be overconfident in the "correctness" of their judgements. Similar findings were revealed from a further study by Friedman et al. (2005), which assessed physicians' over/underconfidence in their diagnostic correctness and showed the tendency towards overconfidence in physicians' diagnostic judgements of 36–41% cases. Evidence has shown physicians' overconfidence as a contributing cause of diagnostic errors (Berner and Graber, 2008).

A number of nursing studies have equally paid attention to nurses' confidence levels in their clinical judgements (Baumann et al., 1991; McMurray, 1992; Thompson, 2003). A recent study (Yang and Thompson, 2010) using paper-based scenarios showed that nurses' confidence was systematically miscalibrated in their critical event risk assessment judgements. However, in using paper-based scenarios Yang and Thompson (2010) left themselves open to the quite reasonable criticism that the miscalibration may be due to a lack of realism in the judgement task used to measure performance.

The hypothesis that confidence miscalibration in decision makers can be attributed to experimental designs that fail to capture the 'realism' of real environments has been raised by other earlier researchers (Bjorkman et al., 1995; Gigerenzer et al., 1991; Juslin, 1993, 1994). Conversely, other studies suggest that decision makers' confidence levels for their judgements are more appropriate when judgement tasks adequately reflect natural judgement environments (Bjorkman et al., 1995; Juslin, 1993, 1994). However, to our knowledge the hypothesis that confidence miscalibration is associated with task realism (which was proposed about two decades ago) has not been quantitatively investigated in clinical calibration studies.

Almost all the clinical confidence calibration studies noted thus far used written case simulations to represent clinical judgement tasks. However, their use as the cornerstone of much work in examining clinical judgement can be questioned. Wigton et al. (1986) state that clinicians may not afford the same quality of attention to a written case simulation as they would to a real clinical situation. In contrast, computerised human patient simulators offer opportunities for capturing reality and enhancing the fidelity of clinical scenarios (Bond et al., 2001; Devitt et al., 2001; Waytt et al., 2007). In the context of clinical simulation, fidelity refers to the degree of similarity between real situation and simulated situation. In fact, fidelity is a 'proxy' of the notion of realism of simulated situations to real situations. Simulations using computerised human patient simulators substantially increase case fidelity, thereby improving the realism of clinical scenarios. With this in mind, this study investigates whether improving the realism of clinical scenarios impacts on nurses' over/underconfidence in their risk

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