Clinical Simulation in Nursing (2017) 13, 478-491

Clinical Simulation in Nursing

www.elsevier.com/locate/ecsn

Review Article

Anxiety and Clinical Performance in Simulated Setting in Undergraduate Health Professionals Education: An Integrative Review

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KEYWORDS
simulation;
anxiety;
stress;
clinical performance;
memory;
undergraduate health professional

Abstract

Background: Undergraduate health professionals clearly experience anxiety during simulation. However, little is known regarding learners' physiological and psychological responses and the influence of these responses on performance.

Method: An integrative review was undertaken to provide a comprehensive understanding of the influence of anxiety on undergraduate health professionals' performance during simulation, and to review the tools and measurements reported in the healthcare literature.

Result: Eleven articles were included showing simulation aroused learners physiologically and psychologically, either improving or declining clinical performance.

Conclusion: Two contrasting perceptions emerged, which are indicative of the current lack of understanding regarding the effects of anxiety on performance in a simulation setting.

Cite this article:
Al-Ghareeb, A. Z., Cooper, S. J., & McKenna, L. G. (2017, October). Anxiety and clinical performance in simulated setting in undergraduate health professionals education: An integrative review. *Clinical Simulation in Nursing, 13*(10), 478-491. http://dx.doi.org/10.1016/j.ecns.2017.05.015.

Background

Stress and anxiety are two complex concepts, and confusion arises from the tendency to use both terms interchangeably (May, 1996). Interestingly, the word ''stress'' has been used

Contributions: Study design: Amal Z. Al-Ghareeb, Simon J. Cooper, and Lisa G. McKenna and data collection, analysis, and manuscript preparation: Amal Z. Al-Ghareeb.

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http://dx.doi.org/10.1016/j.ecns.2017.05.015

widely in psychology, but "it does not encompass the rich meaning of the term anxiety" (May, 1996, p. 46) that is a subjective feeling of uneasiness and apprehension about an undefined threat in the future (Spielberger, 1979). The key difference between the two terms is the source of the stimulus. Stress occurs as a result of external pressure, whereas anxiety occurs as a result of internal pressure (cognitive appraisal). Stress can also be deemed as an objective response, whereas anxiety is a subjective response to a stimulus. Regardless of the differences, both are "transactional between individuals and the situation" (Lazarus, 1966, p. 65) and used interchangeably in health care literature (Melincavage, 2011).

Key Points

- Simulation as teaching tool can be a profound stressor for undergraduate health professionals.
- Feelings of anxiety may interfere with the learning process and inhibit the effectiveness of simulation as an educational tool in healthcare education.
- The influence of anxiety on performance can either enhance or deteriorate performance.

Being in potentially high-anxiety events enhances activity of the hypothalamus–pituitary–adrenal axis. This increases the release of glucocorticoid from the adrenal cortex and across the receptors (hippocampus) in the brain, which is the center of working memory (Selye, 1976). There is a close relationship between anxiety, memory, and learning. However, the effects of anxiety on learning and memory are not always clear (Schwabe & Wolf, 2010). For example, one person might recall that he/she forgot an important appointment due to experiencing a heavy workload, in this example, anxiety impairs memory (Schwabe, Bohringer, & Wolf, 2009). Another person might tell a story about a fearful event during their childhood, which is still remembered intensely decades later. In this case, anxiety enhances memory (Schwabe & Wolf, 2010). Anxiety can either impair cognitive performance when demands exceed the resources to cope or enhance learning (Joels, Wieger, Oitzl, & Krugers, 2006).

In the learning processes, the issue of anxiety is complicated. As early as 1908, Yerkes and Dodson (1908) studied the behavior of mice to determine the relationship between anxiety levels and learning. They sought to assess the habits of the mice subjects choosing and entering one of two boxes or passageways (black and white). In other words, the investigation was based on visual discrimination of box colors. The most favorable stimuli were low-to-moderate shocks, but as the intensity of the shocks increased, the more mice were mistaken and entered the black box. The assumption from this investigation was that performance peaked when there was an optimal level of anxiety (arousal), but a reverse effect occurred as anxiety increased. This relationship between anxiety and

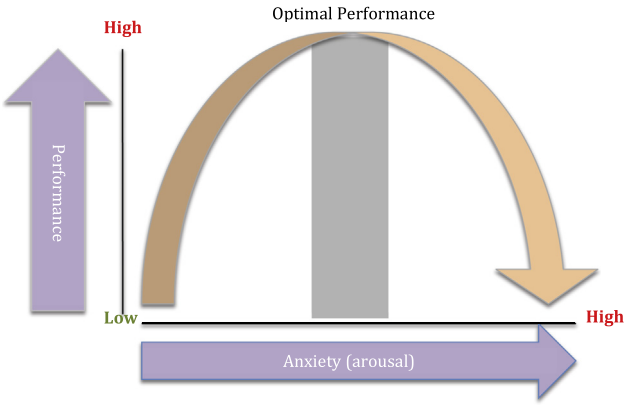

Figure 1 Inverted U-hypothesis (Yerkes and Dodson, 1908).

performance has been referred to as the inverted-U curve due to the reverse effect of performance that may occur. Figure 1 demonstrates the anxiety and performance relationship according to Yerkes and Dodson's law.

The inverted-U law describes, rather than explains, and it is not yet clear why anxiety and performance are related (Eysenck, 1985). Zeidner (1998) provided an interpretation that anxiety "produces restrictions in the range of cue utilization" (Zeidner, 1998, p. 579) with the assumption that the difficult task comprises more cues than an easy one. More cues leads to attentional narrowing and less concentration on the task, which in turn impairs performance. Consequently, the contemporary model of Yerkes and Dodson's law is known as comfort–stretch–panic zones (Palethorpe & Wilson, 2011) and has been adapted widely in the education process. In the comfort zone, individuals know their surroundings, which makes them comfortable with their learning, therefore learning happens by chance. In the panic zones, learning is blocked due to excessive negative emotion involved in stretch zones. When there is a moderate level of anxiety during the stretch zone, learning is promoted. Interestingly, distinguishing between the zones in

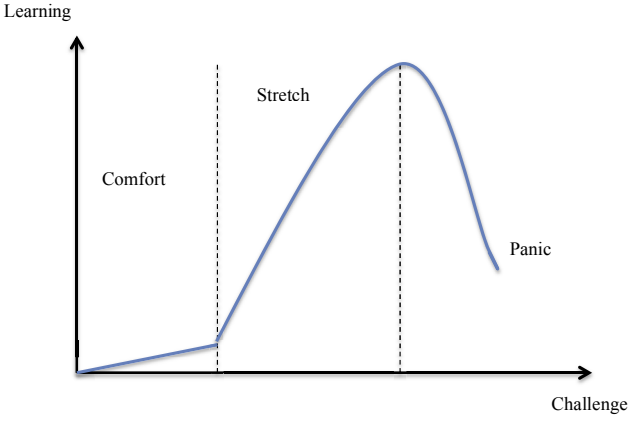

Figure 2 The contemporary model of inverted-U law. Learning zones are adapted from Palethorpe and Wilson (2011).