Development and multilevel assessment of an equine nasogastric intubation simulator in veterinary education

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Nasogastric intubation (NGI) is a routine and potentially life-saving procedure in equine medicine, used to decompress the stomach and administer fluid therapy in horses with gastrointestinal disease. Given the anatomical inability of horses to vomit, timely intervention is critical, making it essential for veterinary students to develop proficiency. Teaching this skill in a live-animal setting presents challenges, including safety risks and welfare concerns such as epistaxis. This study aimed to evaluate the impact of a NGI simulator on student proficiency, assess veterinary team perceptions of its realism and teaching value, and support simulation-based training to enhance education and promote animal welfare. A simulator was developed using a 3D-printed model derived from CT images and molded with silicone to replicate nasal anatomy. Thirty-one third-year veterinary students completed surveys before and after using the model, with some also performing NGI on live horses. Student competence and horse welfare were evaluated after each attempt. Thirteen veterinary team members tested the simulator and completed a post-interaction survey. Student preparedness for NGI and confidence in preventing epistaxis increased post-laboratory ($p = 0.0056$; $p = 0.0418$). The veterinary team found the NGI simulator valuable and realistic for teaching foundational skills. Students and team members found the simulator useful for developing basic skills, while open-ended feedback noted missing anatomical cues such as a trachea and swallowing reflex. These findings highlight the simulator's educational value, with improved student outcomes, positive feedback, and reduced reliance on live animals supporting its role in early training.

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