

First-aid education and motivation for ongoing training among equestrian coaches and instructors in the Czech Republic: A cross-sectional study informed by the theory of planned behavior

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Abstract

Problem Statement. Equestrian sport is associated with a risk of injury, and coaches or instructors supervising riding lessons are often the first responders at the scene of a fall. In the Czech Republic, first aid training is provided only once as part of the initial qualification course, typically in a five- to six-hour block. No periodic retraining is required thereafter. Evidence indicates that first aid knowledge and skills begin to deteriorate within six to twelve months after training. Consequently, participation in continuing first aid education depends entirely on individual motivation. However, the extent of this motivation and coaches' ability to accurately assess their own training needs have not previously been investigated. **Methods.** The study was guided by the Theory of Planned Behaviour, extended by the intention-behaviour gap framework. Attitudes towards the adequacy of the current curriculum and perceived normative support for mandatory retraining served as indicators of intention. Reported participation in refresher training represented behaviour, while self-assessed first aid knowledge served as an indicator of perceived behavioural control and validated against an objective knowledge test. **Purpose.** The study aimed to describe first aid education and refresher-training practices among Czech equestrian coaches and instructors, to determine whether limited participation in continuing education is primarily driven by motivational or structural barriers, and to assess whether self-perceived competence can serve as a proxy for objectively measured competence. **Results.** A self-administered online questionnaire was completed by 104 Czech equestrian coaches and instructors. Most respondents (71.2%) had completed a first aid course outside their qualification programme, and 64.4% reported receiving mandatory first aid instruction during qualification training. Despite this, 41.3% had never attended refresher training, while only 15.4% participated annually. More than half of the respondents (51.0%) considered the current first aid curriculum insufficient, and 84.6% supported mandatory periodic retraining. The mean score on the objective knowledge test was 88.06%. Participants who rated their knowledge as good or sufficient significantly overestimated their performance by 18.75 and 31.15 percentage points, respectively (both $p < .001$). In contrast, respondents who rated their knowledge as excellent underestimated their performance by 8.0 percentage points ($p = .037$). **Conclusions.** Positive attitudes towards additional training and strong normative support for mandatory retraining coexist with low participation in refresher education, suggesting that the primary barrier lies in actual rather than perceived behavioural control. Self-assessment cannot be considered a reliable proxy for first aid competence. Embedding mandatory refresher training within the licence renewal process, rather than relying solely on awareness-raising initiatives, appears to be the most appropriate response.

Key Words: equestrian sport, coach education, first aid training, continuing professional development, self-assessment

Introduction

Equestrian sport combines high speeds, substantial height above the ground, and interaction with a large animal whose behaviour cannot always be predicted. As a result, it is consistently classified among the higher-risk sports. An analysis of an international prospective trauma database found that head and spinal injuries account for a substantial proportion of severe equestrian trauma requiring hospital admission (Weber et al., 2017). Similarly, a recent Scandinavian trauma-centre study identified equestrian accidents as an important cause of injuries resulting in permanent medical impairment (Stigson & Klingegård, 2024). The risk is not limited to elite competition. A considerable proportion of injuries occur during recreational riding and horse-handling activities, including saddling, grooming, and leading horses (McCrorry & Turner, 2005). Concussion rates among equestrians have been reported to exceed those observed in football and rugby, with a higher incidence during riding than during driving or ground-handling activities (Glance et al., 2023). Despite advances in protective

equipment, particularly helmet technology, head and spinal injuries remain the most common forms of serious equestrian trauma (Gates & Lin, 2020).

The most recent synthesis of the epidemiological literature, encompassing 39 studies published between 2018 and 2023, confirmed that falls from horses and kicks remain the predominant mechanisms of equestrian injury. Fractures, together with head, thoracic and abdominal trauma, continue to represent the most common injury diagnoses, while the overall burden of horse-related injuries has changed little in recent years (Neville et al., 2024). Evidence from national emergency department surveillance in the United States indicates that mounted equestrian injuries are approximately twice as likely to result in hospital admission as injuries sustained during unmounted activities. Admission rates are particularly high among patients presenting with fractures or closed head injuries (Acton et al., 2020). Registry-based analyses have further identified head and neck trauma as the leading causes of severe injury and mortality among equestrians (Mutore et al., 2021). Recent European studies have likewise reported substantial rates of hospital admission and surgical intervention following equestrian accidents (Franzén Lindgren et al., 2023; Hoffmann et al., 2023). Such injuries occur in both recreational and occupational settings, each characterised by distinct demographic profiles (Samuels et al., 2022), and are observed across a wide range of competitive disciplines (Haines et al., 2022). Consequently, injury-surveillance data have consistently informed prevention strategies that combine protective equipment, rider education, and appropriate supervision (Pinto et al., 2023).

Coaches and instructors occupy a unique position within the equestrian safety system. In most training environments, the coach is present when an accident occurs and is therefore often the first person available to provide assistance, frequently several minutes before professional emergency medical services arrive. Current European guidelines emphasise that the prompt and appropriate delivery of first aid by non-medical responders can significantly improve patient outcomes (Djäv et al., 2025). This responsibility is heightened by the characteristic injury patterns associated with equestrian accidents. Suspected spinal injuries, head injuries accompanied by altered consciousness, and fractures require more complex immediate management than the soft-tissue injuries commonly encountered in many field sports.

The effectiveness of first aid provided by non-medical responders depends largely on the quality, relevance, and currency of their training. A scoping review of public first aid education identified substantial variation in training content, duration, and quality, while noting that the relationship between training and competent performance in real emergencies has rarely been evaluated (Heard et al., 2020). Accordingly, the European Resuscitation Council recommends that first aid training be tailored to the specific needs and likely emergency scenarios of the target population. The guidelines also advocate short, regular refresher sessions as a more effective strategy for maintaining competence than infrequent, longer courses (Nabecker et al., 2025). A systematic review found that willingness to provide first aid is associated with both self-efficacy and previous training experience; however, neither factor necessarily reflects actual performance quality in practice (Riggs et al., 2019). Similarly, Czech educational literature addressing non-medical professions emphasises practical, scenario-based instruction as the cornerstone of effective first aid education (Haluzíková, 2023).

International evidence regarding first aid competence among sports coaches raises concerns about the adequacy of current training and certification practices. In a study of 104 interscholastic athletic coaches, only 36% achieved a passing score on a standardised first aid assessment, leading the authors to conclude that coaches did not meet established competency standards (Ransone & Dunn-Bennett, 1999). Similarly, surveys of youth sport coaches have reported formal first aid certification rates as low as 19% (Barron et al., 2009). More recent evidence suggests that these shortcomings persist. Soni and Vora (2025) found that although athletes and coaches expressed positive attitudes towards injury prevention, their knowledge, particularly in the area of basic first aid, remained limited. This discrepancy between favourable attitudes and actual competence highlights the need for objective assessment of first aid knowledge and provides an important rationale for the present study (Soni & Vora, 2025).

In the Czech Republic, the education and licensing of equestrian coaches and instructors are administered by the Czech Equestrian Federation (ČJF) through a tiered qualification system comprising instructor certification and two coaching levels (Czech Equestrian Federation, 2025). First aid education is delivered within a broader module covering hygiene, injury prevention, first aid, and recovery. At instructor level, this module consists of five hours of instruction, including four hours of theory and one hour of practical training. At Coach Class II level, it comprises six hours, including four hours of theoretical and two hours of practical instruction. Although Coach Class II licence holders are required to undergo requalification every five years, this process does not include dedicated first aid retraining, and no mandatory first aid refresher requirement exists at any qualification level.

This arrangement creates a distinct challenge for equestrian safety. First, first aid competence is established during initial qualification but is not supported by any formal mechanism for ongoing maintenance. This is noteworthy because systematic reviews of first aid and resuscitation education consistently demonstrate that both knowledge and, even more rapidly, practical skills deteriorate within six to twelve months after training. For individuals who use these skills infrequently, refresher training at intervals not exceeding twelve months has been recommended to maintain competence (Nas et al., 2019; Yang et al., 2012). Second, in the absence of mandatory retraining requirements, continuing first aid education depends entirely on individual

initiative. However, it remains unclear whether coaches and instructors are sufficiently motivated to pursue refresher training voluntarily or whether they can accurately recognise their own need for further education.

This distinction has direct practical implications. If coaches value first aid education and are willing to participate in refresher training, but lack an institutional framework that facilitates or requires it, the appropriate response is structural, namely the introduction of mandatory refresher training linked to licence renewal. Conversely, if motivation to engage in continuing education is itself lacking, educational campaigns and awareness-raising strategies become the primary intervention. These explanations imply substantially different policy responses and, therefore, require empirical investigation before effective measures can be implemented. For populations that rarely encounter situations requiring first aid, maintaining competence presents a particular challenge. Opportunities to apply learned skills are infrequent, limiting the reinforcement that practical experience can provide. At the same time, when emergencies do occur, the consequences of delayed or inappropriate intervention may be serious. In equestrian sport, where falls can result in head injuries, suspected spinal trauma, or fractures, maintaining a current level of first aid competence is therefore especially important. Evidence from both occupational and lay first aiders supports the need for regular refresher training. Among workplace first responders, practical first aid skills declined substantially in the years following certification (Anderson et al., 2011). Similarly, a study comparing training schedules demonstrated that brief, more frequent practice sessions resulted in better retention of resuscitation skills than less frequent training opportunities (Oermann et al., 2020). These findings are consistent with broader evidence indicating that first aid knowledge and practical skills deteriorate over time in the absence of reinforcement. Consequently, for equestrian coaches and instructors, who may rarely need to provide first aid but may face serious injuries when they do, a model of regular refresher training appears more appropriate than reliance on a single episode of instruction during initial qualification.

Conceptual framework

The study is grounded in the Theory of Planned Behaviour (TPB) (Ajzen, 1991), which proposes that behaviour is predicted by behavioural intention, itself shaped by attitudes, subjective norms, and perceived behavioural control. In the present study, the framework is extended by incorporating the well-established intention-behaviour gap, which recognises that intentions do not always translate into action (Sheeran & Webb, 2016). According to this perspective, behaviour is influenced not only by intention but also by the degree of actual behavioural control available to the individual. Factors such as time, cost, access to training opportunities, and external requirements may facilitate or constrain behaviour even when motivation is high. This extended framework has proved useful in studies of first aid and bystander resuscitation, where positive attitudes consistently predict intention, while actual helping behaviour occurs less frequently than intended (Zheng et al., 2026).

Meta-analytic evidence indicates that the TPB explains a substantial proportion of variance in behavioural intention but considerably less variance in actual behaviour. Its predictive power is particularly reduced for behaviours that must be repeated over extended periods rather than performed as one-time actions (Armitage & Conner, 2001; McEachan et al., 2011). A discrepancy between intention and behaviour is therefore expected rather than exceptional in recurring activities such as periodic first aid refresher training. The framework is consequently well suited to distinguishing between motivational barriers, which influence intention formation, and structural barriers, which impede the translation of intention into behaviour.

Applied to equestrian coaches and instructors, the framework generates several testable expectations. Attitudes towards the adequacy of existing first aid education and support for mandatory retraining are treated as indicators of intention, while reported participation in refresher courses represents behaviour. A discrepancy between favourable attitudes and low participation would suggest that barriers arise from limitations in actual rather than perceived behavioural control. Perceived behavioural control is operationalised through self-assessed first aid knowledge. Comparing self-assessments with objectively measured knowledge allows evaluation of whether this component of the model is accurately calibrated. If perceived competence differs substantially from actual competence, both intention formation and policy decisions based on self-reported preparedness may be distorted. The operationalisation of TPB constructs used in this study is presented in Table I.

The decision to examine the calibration of perceived behavioural control rather than relying solely on self-reported competence is supported by substantial evidence indicating that self-assessment in health-related domains is often a poor predictor of actual performance (Davis et al., 2006; Eva & Regehr, 2005). Individuals frequently overestimate or underestimate their abilities, making objective assessment essential when competence has direct implications for safety.

Problem Statement and Study Approach

Equestrian coaches and instructors occupy a unique position within the chain of emergency response. By the nature of their role, they are often the first individuals available to provide assistance when a rider is injured. Nevertheless, their first aid competence is formally established only once during initial qualification and is not subsequently subject to mandatory maintenance. At present, little is known about the extent to which these individuals voluntarily pursue continuing first aid education or how accurately they can evaluate their own competence. Within the Czech federation-based licensing system, decisions regarding the potential introduction of mandatory refresher training therefore lack an empirical evidence base.

To address this gap, a nationwide cross-sectional online survey was conducted among coaches and instructors licensed by the Czech Equestrian Federation (ČJF). The survey collected information on first aid education history, participation in refresher training, and attitudes towards the current educational system. In addition, respondents completed a scenario-based knowledge test developed in accordance with current European first aid guidelines. Self-assessed knowledge was subsequently compared with objectively measured knowledge, and the findings were interpreted using the Theory of Planned Behaviour as the primary explanatory framework.

The study also builds upon the authors' previous research examining first aid preparedness in non-medical populations (Böhm et al., 2023; Lešták et al., 2021).

Accordingly, the study addresses three research questions: (1) To what extent have equestrian coaches and instructors pursued first aid education beyond the mandatory training included in their qualification, and how frequently do they participate in refresher training? (2) How do coaches and instructors evaluate the adequacy of the current mandatory first aid curriculum, and to what extent do they support regular mandatory retraining? (3) Does subjective self-assessment of first aid knowledge correspond with objectively measured knowledge?

Contribution of the Study

This study makes three principal contributions to the literature. First, it provides the first systematic description of first aid education and refresher-training behaviour among equestrian coaches and instructors within a Central European federation-based licensing system. Second, it empirically distinguishes between motivational and structural explanations for the limited uptake of continuing first aid education. Third, it evaluates whether self-assessed competence can serve as a proxy for objectively measured competence in licensing and educational decision-making. This question has direct practical relevance for sports federations operating under limited training budgets, as it informs the extent to which self-reported preparedness can be relied upon when identifying training needs and allocating educational resources.

Material & methods

Participants

The study sample comprised 104 equestrian coaches and instructors actively practising in the Czech Republic. Respondents identified their current role as instructor ($n = 80$, 76.9%), coach ($n = 13$, 12.5%), or both, indicating that they had previously worked as instructors and were currently practising as coaches ($n = 11$, 10.6%). For the purpose of group comparisons, the latter two categories were combined into a single coach group ($n = 24$, 23.1%), reflecting respondents' highest qualification level.

Participants represented all regions of the Czech Republic. The largest proportions were drawn from the Central Bohemian Region ($n = 32$, 30.8%) and Prague ($n = 16$, 15.4%). Professional experience varied considerably, ranging from six months to 50 years among instructors and from 2 to 51 years among coaches. Detailed sample characteristics are presented in Table II.

Data collection instrument

Data were collected using a self-administered online questionnaire developed specifically for this study in Google Forms, as no validated instrument addressing first aid education among equestrian coaches and instructors was available. Questionnaire items were derived from three principal sources: the Czech Equestrian Federation (ČJF) qualification curriculum for the first aid module (Czech Equestrian Federation, 2025), the European Resuscitation Council first aid guidelines (Djävrv et al., 2025), and previous surveys examining first aid competence among sports coaches (Ransone & Dunn-Bennett, 1999).

The questionnaire consisted of both closed-ended and open-ended items organised into four thematic sections. The first section collected demographic information, including age, region, professional role, and years of experience. The second examined first aid education and experience, including participation in first aid courses beyond the mandatory qualification curriculum, frequency of refresher training, and self-assessed first aid knowledge. The third focused on preparedness to provide first aid, addressing the availability of basic first aid equipment and respondents' opinions regarding the adequacy of the current educational curriculum. The fourth section assessed knowledge through five scenario-based multiple-choice questions describing situations commonly encountered in equestrian practice, each with four response options and a single correct answer.

The knowledge assessment covered five emergency scenarios: an unconscious rider following a fall, a conscious but confused rider after a head injury, recognition of signs suggestive of spinal cord injury, management of a rider presenting with otorrhagia and anisocoria following a kick to the head, and a case of generalised seizures.

Correct responses were defined in accordance with the European Resuscitation Council first aid guidelines and were reviewed for content validity by two specialists in prehospital emergency medicine prior to questionnaire distribution. The average completion time was approximately 5 to 10 minutes.

The reliability of the five-item knowledge scale was not formally assessed during the original data collection process. This limitation is acknowledged and discussed in the study limitations section. The full questionnaire is available from the corresponding author upon reasonable request.

Procedure

A cross-sectional study design was employed. Data were collected between 7 February and 29 April 2025. Participants were recruited through multiple channels to maximise reach within the Czech equestrian community. Invitations were distributed via publicly available Czech Equestrian Federation (ČJF) contact databases and official equestrian club websites, with potential respondents contacted directly by e-mail. In addition, the survey was disseminated through specialised social media groups dedicated to equestrian coaching and instruction, allowing recruitment beyond directly identifiable contacts.

Because dissemination through social media involved an open and indeterminate audience, the number of individuals exposed to the survey invitation could not be determined. Consequently, a conventional response rate could not be calculated, and the sample should be regarded as self-selected rather than representative of all Czech equestrian coaches and instructors.

The study is reported in accordance with the Checklist for Reporting Results of Internet E-Surveys (Eysenbach, 2004) to enhance transparency and reporting quality in web-based survey research.

Data analysis

Responses to closed-ended items were summarised using absolute and relative frequencies. Open-ended responses, such as those describing the most frequently encountered types of injury, were coded into thematic categories and analysed using frequency counts. Because respondents were permitted to report more than one condition, the total number of responses exceeds the number of respondents.

Differences between instructors and coaches in objective first aid knowledge were examined using an independent-samples t-test. To evaluate whether knowledge-test performance varied according to participation in refresher training, a one-way analysis of variance (ANOVA) was conducted across four refresher-training frequency categories: annual participation, participation every two years, participation less frequently than every three years, and no participation in refresher training.

The relationship between subjective self-assessment and objective performance was assessed using paired-samples t-tests within each self-assessment category. To enable direct comparison, both measures were expressed on a common percentage scale. Self-assessment categories were assigned predefined percentage values: 95% (excellent), 85% (very good), 75% (good), 50% (sufficient), and 25% (insufficient). Objective performance scores ranged from 20% (one correct response) to 100% (all five responses correct). Positive difference scores indicated that objective performance exceeded the level implied by respondents' self-assessment (underestimation of competence), whereas negative scores indicated that objective performance was lower than the level implied by self-assessment (overestimation of competence).

Statistical significance was set at $p < .05$. All analyses were performed using IBM SPSS Statistics and Microsoft Excel.

Table I. Operationalisation of the Theory of Planned Behaviour in the present study

Construct	Questionnaire indicator	Observed value
Attitude	Perceived adequacy of the current mandatory curriculum	51.0% consider it insufficient
Subjective norm	Support for introducing mandatory periodic retraining	84.6% in favour
Perceived behavioural control	Subjective self-assessment of first aid knowledge	67.3% rate themselves very good or good
Actual behavioural control	Availability of basic first aid equipment; absence of any mandated refresher requirement	94.2% equipped; no requirement exists
Behaviour	Reported frequency of first aid refresher training	41.3% never attend

Results

Sample and first aid education

Sample characteristics are summarised in Table II. Most respondents ($n = 74$, 71.2%) reported having completed a first aid course outside their coaching or instructor qualification programme, whereas 23 (22.1%) had not and 7 (6.7%) were unsure. Among those who had completed such training, the most frequently reported year of completion was 2024 ($n = 25$), followed by 2023 ($n = 13$) and 2020 ($n = 10$).

Thus, most respondents had completed their most recent external first aid course within the previous five years, although a small number reported substantially older courses (1978 and 1985).

Regarding mandatory first aid instruction within the qualification programme, 67 respondents (64.4%) reported having completed it, 20 (19.2%) reported that they had not, and 17 (16.3%) could not recall. Considering both educational pathways, at least 87 of 104 respondents (83.7%) reported some form of first aid education, indicating that the absence of any first aid training was uncommon in this sample.

Table II. Sample characteristics and first aid education (N = 104)

Characteristics	n	%
Role – instructor	80	76.9
Role – coach (incl. former instructors)	24	23.1
Age 18–25 years	23	22.1
Age 26–35 years	29	27.9
Age 36–45 years	20	19.2
Age 46–55 years	22	21.2
Age 56 years or older	10	9.6
External first aid course completed	74	71.2
Mandatory first aid within qualification recalled	67	64.4
Personal experience of providing first aid	68	65.4
Basic first aid equipment available	98	94.2

Refresher Training and Perceived Adequacy of the Curriculum

Table III summarises refresher training practices and attitudes towards first aid education. The largest group of respondents (n = 43, 41.3%) reported never attending refresher training. Among those who participated in refresher training, the most common pattern was attendance at intervals exceeding three years (n = 23, 22.1%), followed by training every two years (n = 22, 21.2%). Only 16 respondents (15.4%) reported annual refresher training. Overall, 61 of 104 respondents (58.7%) reported participating in refresher training at some frequency. Just over half of the respondents (n = 53, 51.0%) considered the current mandatory curriculum insufficient, whereas fewer than one quarter (n = 24, 23.1%) considered it sufficient; 27 respondents (25.9%) were undecided. Respondents who viewed the curriculum as insufficient outnumbered those who considered it sufficient by approximately 2.2 to 1.

Support for mandatory periodic retraining was high, with 88 respondents (84.6%) expressing agreement. Only 2 respondents (1.9%) disagreed, while 14 (13.5%) were unsure. This represented the strongest and most consistent opinion observed in the survey and contrasted with the finding that 41.3% of respondents reported never attending refresher training.

Table III. Refresher training frequency and attitudes towards the current system (N = 104)

Item	n	%
Refresher training – annually	16	15.4
Refresher training – every two years	22	21.2
Refresher training – more than every three years	23	22.1
Refresher training – never	43	41.3
Current curriculum considered insufficient	53	51.0
Current curriculum considered sufficient	24	23.1
Undecided on curriculum adequacy	27	25.9
Supports mandatory periodic retraining	88	84.6
Opposes mandatory periodic retraining	2	1.9

Practical Experience and Objective Knowledge

A majority of respondents (n = 68, 65.4%) reported having personally provided first aid during their coaching or instructional practice. The most frequently encountered conditions were fractures (58 mentions) and head injuries (54 mentions), followed by wounds (30), bruises (22), and minor abrasions (15). Less frequently reported conditions included bleeding and suspected spinal injuries (four mentions each), dislocations (three mentions), and allergic reactions (one mention). Only five respondents indicated that they had never encountered a situation requiring first aid. Nearly all participants (n = 98, 94.2%) reported having access to basic first aid equipment.

The mean score on the five-item knowledge test was 88.06%, indicating a generally high level of theoretical knowledge. Performance at the item level, however, was uneven (Table IV). Respondents achieved near-ceiling scores on questions involving the recognition of spinal cord injury and the management of a conscious but confused rider. In contrast, substantially lower scores were observed for scenarios involving an unconscious rider and a rider presenting with a head injury accompanied by otorrhagia and anisocoria. In the latter case, approximately one quarter of respondents selected a positioning strategy that was inconsistent with current first aid recommendations.

Instructors achieved slightly higher knowledge-test scores (M = 89.25%, SD = 13.48) than coaches (M = 84.17%, SD = 16.66), representing a difference of 5.08 percentage points. However, this difference did not reach statistical significance. Similarly, a one-way analysis of variance revealed no significant differences in

knowledge-test performance across the four refresher-training frequency groups ($F = 0.68$, $p > .10$). Although the observed pattern was consistent with expectations, respondents who reported attending refresher training annually achieved the highest mean score (92.5%), whereas those participating less frequently than once every three years achieved the lowest mean score (86.09%). Pairwise comparisons between groups were likewise non-significant (all $p > .10$).

Table IV. Performance on individual knowledge-test items ($N = 104$)

Scenario	Correct (n)	%
Unconscious rider lying on a side after a fall	79	76.0
Conscious but confused rider after head impact	103	99.0
Recognition of spinal cord injury	103	99.0
Head injury with otorrhagia and anisocoria	77	74.0
Generalised seizures	96	92.3
Mean score across all five items	–	88.06

Self-Assessment of First Aid Knowledge and Objective Performance

Respondents most frequently rated their knowledge as very good ($n = 38$, 36.5%) or good ($n = 32$, 30.8%), followed by sufficient ($n = 23$, 22.1%). Ten respondents (9.6%) rated their knowledge as excellent, whereas one respondent (1.0%) rated it as insufficient. Comparison of these ratings with objective performance revealed a clear and asymmetric pattern of miscalibration (Table V). Respondents who rated their knowledge as good scored 18.75 percentage points below the value implied by their rating ($p < .001$), while those rating it as sufficient scored 31.15 percentage points below the implied value ($p < .001$), indicating substantial overestimation of competence in both groups. In contrast, respondents rating their knowledge as excellent scored 8 percentage points above the implied value ($p = .037$), indicating realistic or slightly modest self-assessment. The very good group showed a small, non-significant difference in the same direction as the lower-rated groups (–5.96 percentage points, $p = .070$). The single respondent who rated their knowledge as insufficient could not be analysed.

This pattern was consistent with that described by Kruger and Dunning (1999). Miscalibration was confined to the lower self-rating categories and increased as self-ratings decreased, whereas respondents with the highest self-ratings were the most accurate.

Table V. Difference between objectively measured performance and the value implied by self-assessment

Self-rating	n	Difference (percentage points)	p
Excellent	10	+8.00 (underestimation)	.037
Very good	38	–5.96 (overestimation)	.070
Good	32	–18.75 (overestimation)	< .001
Sufficient	23	–31.15 (overestimation)	< .001
Insufficient	1	not analysed	–

Discussion

Three findings are particularly noteworthy. First, most respondents had received some form of first aid education, indicating that a complete absence of training was uncommon. Second, despite this, 41.3% reported not attending any refresher training, and only 15.4% attended annually, suggesting that initial training is not regularly maintained for many respondents. Third, respondents themselves recognised this issue: half considered the current curriculum insufficient, and 84.6% supported mandatory periodic retraining, representing the highest level of agreement observed for any survey item.

When interpreted through the Theory of Planned Behaviour, this pattern is informative rather than merely descriptive. Attitudes towards the behaviour appear favourable, as most respondents considered the current provision inadequate. Subjective norms were also strongly supportive, reflected in the widespread endorsement of mandatory retraining. Perceived behavioural control was partially supported by the finding that 94.2% possessed basic first aid equipment. Indicators of intention were therefore present, yet behaviour did not consistently correspond. Within the framework, this suggests a limitation in actual behavioural control rather than motivation. Specifically, the absent control element appears to be an external requirement. In the absence of mandatory first aid requalification at any qualification level, continued education depends on individual initiative, time and cost. This pattern is consistent with the intention-behaviour gap described by Sheeran and Webb (2016). Consequently, awareness-raising interventions may have limited impact, whereas structural requirements may address the component that is currently lacking. This interpretation is consistent with meta-analytic evidence demonstrating that the model predicts intention more reliably than repeated behaviour (McEachan et al., 2011).

The calibration analysis provided a second important finding. Perceived behavioural control, operationalised as self-assessed knowledge, was systematically miscalibrated in the lower rating categories, with overestimation of 18.75 and 31.15 percentage points among respondents rating themselves as good and sufficient, respectively. Within the model, inaccurate perceptions of competence may reduce the predictive value of intention, as respondents who perceive themselves as adequately prepared may not recognise a need for further action. From a practical perspective, this finding suggests that coaches' self-assessments cannot be relied upon to identify individuals requiring additional training, because those most in need may be least likely to recognise this need. The observed pattern, characterised by relatively accurate self-assessment among the highest scorers and increasing overestimation as self-ratings declined, is consistent with the effect described by Kruger and Dunning (1999). Similar findings have been reported in studies comparing physicians' self-assessed competence with objectively observed performance (Davis et al., 2006; Kruger & Dunning, 1999). The non-significant ANOVA comparing refresher-training frequency groups requires careful interpretation and should not be considered evidence that no association exists. Mean scores followed the expected pattern, with annual participants achieving the highest results. However, the five-item test was likely insufficiently sensitive to discriminate between groups. Two of the five items were answered correctly by 99% of respondents, leaving only three items to contribute meaningful variation. Such a ceiling effect may substantially reduce the ability to detect genuine associations. The appropriate conclusion is therefore that the present instrument was unable to detect an effect of refresher-training frequency rather than demonstrating that none exists. This interpretation is supported by evidence documenting skill decay following first aid and resuscitation training (Nas et al., 2019; Yang et al., 2012).

The item-level results also have implications for curriculum design. The two scenarios associated with the lowest levels of correct responses, namely the unconscious rider and the rider with head injury accompanied by otorrhagia and anisocoria, both involved decisions regarding positioning and airway management in the presence of suspected spinal injury. These are decisions that coaches may be required to make before emergency medical services arrive and may be less frequently addressed in general first aid courses that are not tailored to the equestrian context. The finding that 99% of respondents correctly identified the symptoms of spinal cord injury, whereas only 76% selected the correct response in the unconscious rider scenario, illustrates the distinction between declarative knowledge and procedural decision-making, which written tests can capture only partially.

Regarding injury patterns, fractures and head injuries were by far the most frequently reported injuries, consistent with international equestrian trauma research (Weber et al., 2017; Gates & Lin, 2020). Similar distributions have been reported in recent reviews of horse-related trauma and in national registry and emergency department data (Acton et al., 2020; Mutore et al., 2021; Neville et al., 2024). Spinal injuries were reported only infrequently. This discrepancy may reflect the characteristics of the present sample, which consisted predominantly of instructors working with beginner riders and lower-intensity activities. It may also reflect the fact that coaches are not always informed of definitive medical diagnoses after injured riders have been transferred to hospital, resulting in some spinal injuries remaining unrecognised. Although injuries sustained during horse handling were not specifically addressed in the present questionnaire, previous research has shown that a substantial proportion of equestrian injuries occur during handling rather than riding (Glance et al., 2023; McCrory & Turner, 2005). This may represent an area for consideration in future first aid curricula.

Limitations

Several limitations should be considered. The sample included substantially fewer coaches ($n = 24$) than instructors ($n = 80$), limiting the statistical power of group comparisons and likely contributing to the non-significant difference in knowledge-test performance despite a numerically meaningful gap. The cross-sectional, self-selected online design is susceptible to volunteer bias, as coaches with a greater interest in first aid may have been more likely to participate. This would be expected to inflate, rather than deflate, reported levels of education and motivation, suggesting that the true proportion of individuals not attending refresher training may exceed 41.3%. Because recruitment included open social media channels, no response rate could be calculated, and the sample cannot be considered representative of the national population of ČJF coaches and instructors. The knowledge instrument was developed specifically for this study. Although the items were derived from current guidelines and reviewed for content validity, internal consistency was not assessed. Furthermore, with only five items, two of which demonstrated near-ceiling performance, the instrument had limited discriminatory capacity. The assessment measured declarative knowledge rather than practical performance under realistic conditions. The percentage values assigned to self-assessment categories, while selected to provide an even distribution across the scale, were necessarily arbitrary. Consequently, the magnitude, although not the direction or statistical significance, of the observed calibration differences depended on this assignment; a Bland-Altman analysis of agreement would be preferable in future research. Several items relied on free-text responses that required subjective categorisation. Finally, the analyses were based on aggregate group comparisons rather than an individual-level multivariable model; therefore, the reported associations are descriptive and do not establish causal relationships between training frequency and competence.

Conclusions

Returning to the three research questions, most coaches and instructors had received some form of first aid education; however, the majority did not maintain it through regular refresher training. Specifically, 41.3% reported not attending any refresher training, while only 15.4% attended annually. A clear majority considered the current curriculum inadequate, and 84.6% supported mandatory retraining. Furthermore, self-assessed knowledge did not correspond reliably with measured knowledge, with substantial overestimation observed among respondents who rated their knowledge as good or sufficient.

Within the framework of the Theory of Planned Behaviour, the combination of favourable attitudes and strong normative support with low participation in refresher training suggests that the primary barrier lies in actual behavioural control rather than motivation. At the same time, perceived behavioural control appears to be poorly calibrated among those respondents who would benefit most from additional training. The practical implication is straightforward: awareness campaigns are unlikely to substantially influence behaviour in this population because attitudes towards first aid training are already positive. In contrast, a structural requirement incorporated into licence renewal would address the factor that is currently lacking.

Three implications for federations and coach education providers emerge from these findings. First, given the strong support expressed by coaches themselves, introducing a mandatory first aid refresher requirement at fixed intervals as part of continuing certification would likely encounter little resistance. Evidence on skill decay suggests that such training should occur at intervals not exceeding two years, and preferably annually for a population that uses these skills infrequently. Second, because self-assessment was a poor predictor of objective performance, providers should not rely on coaches' own judgements when identifying training needs. Brief, low-stakes knowledge assessments incorporated into licence renewal could help identify individuals who would benefit most from additional training, irrespective of experience or confidence. Third, because fractures and head injuries represented the most commonly encountered injuries, and because the weakest performance was observed in scenarios involving positioning decisions when spinal injury was suspected, refresher training should be scenario-based and tailored specifically to equestrian incidents rather than delivered in a generic format. Accessibility is equally important. Short online modules combined with periodic in-person practical sessions may reduce the time and financial barriers that plausibly contribute to the current gap in participation. Such an approach is consistent with current European recommendations favouring brief, repeated, scenario-based refresher training (Nabecker et al., 2025; Oermann et al., 2020).

Future research should evaluate whether a mandatory and regularly repeated curriculum improves practical performance as well as declarative knowledge. It should also include a larger and more balanced sample of coaches and instructors and employ a longer, formally validated assessment instrument capable of discriminating across higher levels of competence, as the present five-item test lacked sufficient discriminatory capacity.

Ethics

Participation in the study was voluntary and anonymous. No sensitive personal data, health-related information, or identifiable information were collected, and the study did not involve any intervention. All participants provided informed consent prior to participation. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Following completion of the study, the research protocol and procedures were reviewed by the Ethics Committee of the Faculty of Biomedical Engineering, Czech Technical University in Prague. In its opinion dated 19 August 2026, the Committee concluded that the study met all applicable ethical and legal requirements and identified no breach of the fundamental ethical principles governing research involving human participants, no violation of personal data protection requirements, and no conflict with other relevant regulations.

Conflicts of interest

The authors declare no conflicts of interest. This article is based on the second author's final thesis. No specific funding was received for this research. The authors thank all the equestrian coaches and instructors who voluntarily completed the questionnaire.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used Claude Opus 5.0 (Anthropic) for language editing and proofreading. Zotero (version 9.0.6 (64-bit)) was used to format and verify the sources used. The authors reviewed and edited the output and take full responsibility for the content of the publication.

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