Lifestyle Factors Influencing Colic Risk in Horses: A French Cross-Sectional Survey

Keywords: horse; colic; management; risk factors; lifestyle; France

Abstract

Colic remains one of the leading causes of morbidity and mortality in horses worldwide. Although numerous risk factors have been reported, most epidemiological data originate from studies performed more than two decades ago and outside France. The present cross-sectional study aimed to identify lifestyle-related risk factors for equine colic within the French horse population. An online questionnaire was distributed to horse owners to collect detailed information on individual characteristics, housing conditions, feeding practices, activity level, transport history, and health management, as well as the occurrence of previous colic episodes. Data from 645 horses were analysed using logistic regression models (Stata 17), grouping explanatory variables by major domains.

Significant risk factors included owner-reported nervous temperament (odds ratio [OR] = 1.66, p = 0.010), housing in a stall with or without paddock turnout (OR = 3.07 and 4.79, p = 0.023 and 0.045, respectively), and a history of digestive (OR = 3.13, p = 0.001) or reproductive disorders (OR = 3.84, p = 0.045). Conversely, a lower risk of colic was observed in horses of unknown breeding (OR = 0.51, p = 0.037), in those receiving fresh grass daily (OR = 0.63, p = 0.023), in animals dewormed only after a positive fecal egg count or one to two times per year (OR = 0.28 and 0.65, p = 0.041 and 0.025), and in pastured horses with larger available surface area (p = 0.007). Unexpected inverse associations were found for daily concentrate intake and infrequent dental care, which are likely attributable to reporting bias and imprecise classification of feed and management practices.

This first large-scale French survey provides an updated overview of horse management and highlights modifiable factors associated with colic risk. The findings support targeted recommendations on housing and parasite control while underscoring the need for longitudinal studies to clarify causal relationships and to investigate other potential determinants such as vaccination, hoof care, or climatic influences.

Introduction

Equine colic encompasses a spectrum of gastrointestinal disorders that represent a major health and welfare concern. Colic is a leading cause of emergency veterinary intervention and a significant source of mortality and economic loss **(Archer et Proudman, 2006)**. Numerous epidemiological studies conducted in the 1990s and early 2000s identified risk factors related to diet composition, stabling, parasitism, and management routines **(Curtis et al., 2019)**. However, horse-keeping practices evolve over time and vary across countries, and few recent data describe current

management in France.
The objective of this study was to explore the relationship between lifestyle variables and the occurrence of colic in horses living in France, using a large owner-reported dataset and multivariable statistical modelling.

Materials and Methods

A cross-sectional survey was developed in French and distributed via an online platform (Google Forms). The questionnaire collected detailed information in six domains: (1) individual characteristics (sex, breed, height, body-condition score, temperament), (2) housing (type of accommodation, bedding, water supply, paddock access), (3) feeding practices (type and quantity of forage, concentrates, and supplements), (4) activity (discipline, training frequency, competition level), (5) transport frequency and distance, and (6) health management (worming, dental care, medical history, stereotypic behaviours). Owners were asked to report any previous episodes of colic diagnosed by a veterinarian.
Data were imported into Numbers for initial cleaning and descriptive statistics, then analysed with Stata 17. For each thematic domain, binary logistic regression models were built with the occurrence of at least one colic episode as the dependent variable. Odds ratios (OR) with 95 % confidence intervals (CI) were calculated; $p < 0.05$ was considered significant.

Results

Responses from 587 horses were included after quality control. The population encompassed a broad range of breeds, ages, and disciplines representative of the diversity of French leisure and sport horses.
Significant associations emerged in several domains:

- **Individual factors** – Horses described as nervous by their owners had a higher risk of colic (OR = 1.66, p = 0.010). No effect of sex or height was detected, but horses of unknown breeding exhibited a lower risk (OR = 0.51, p = 0.037).

- **Housing** – Stabling was strongly associated with colic: stall with paddock turnout (OR = 3.07, p = 0.023) and full-time stall confinement (OR = 4.79, p = 0.045) compared with full-time pasture. For partially pastured horses, a larger paddock area per horse was inversely related to risk (p = 0.007, OR close to 1).

- **Feeding** – Daily access to fresh grass reduced risk (OR = 0.63, p = 0.023). Surprisingly, greater daily concentrate intake correlated with lower risk (p = 0.024, OR = 0.86), contrary to established literature.

- **Health management** – Targeted deworming, either following a positive fecal egg count or performed once to twice yearly, was protective compared with more frequent treatments (OR = 0.28 and 0.65, p = 0.041 and 0.025). Horses with a history of digestive (OR = 3.13, p = 0.001) or reproductive disorders (OR = 3.84, p = 0.045) had increased risk. Infrequent dental care appeared protective, again contradicting established knowledge.

- **Activity and transport** – No significant associations were found with discipline, training frequency, competition level, or transport habits.

Discussion

This investigation updates the epidemiological landscape of equine colic in France and aligns with many previously reported risk factors, notably the deleterious effect of confinement and the influence of temperament. The protective association of fresh grass intake reinforces the importance of fibre-rich diets in maintaining gut motility and microbial balance.
Unexpected findings included the inverse relationship between concentrate intake and colic risk and the apparent protection conferred by infrequent dental care. These are likely explained by owner-reported biases, imprecise feed categorisation (e.g. inclusion of high-fibre or mineral supplements within “concentrates”), and possible confounding by management system (for example, horses on full pasture may receive little concentrate and limited dental follow-up).
The protective effect of targeted deworming is consistent with current recommendations aimed at reducing anthelmintic resistance, which advocate fecal egg count monitoring and selective treatment. Nevertheless, parasite load and drug resistance status were not directly measured in our sample, so residual confounding cannot be excluded.

Several limitations must be acknowledged. Data were self-reported by owners and therefore subject to recall error and misclassification. Some management variables—such as exact concentrate composition, water source, or paddock dimensions—were only approximately described. The cross-sectional design precludes establishing temporal or causal relationships. Finally, although the overall sample size was robust, stratification by region or rare exposures reduced the power of certain subgroup analyses.

Despite these constraints, this is the first large-scale survey of its kind in France and provides a contemporary overview of equine management practices. The study highlights modifiable risk factors—particularly housing and targeted parasite control—that can inform preventive strategies and owner education.

Conclusion

Colic remains a multifactorial condition influenced by management practices. In this French cohort, nervous temperament, stall housing, and a history of digestive or reproductive disorders emerged as significant risk factors, whereas daily access to grass, targeted deworming, and greater pasture area per horse were protective. These findings reinforce recommendations favouring outdoor housing and evidence-based parasite control and illustrate the value of owner-reported data for population health surveillance. Future longitudinal studies integrating direct veterinary assessments, detailed dietary analyses, and climatic parameters will be essential to confirm causal relationships and to guide refined prevention strategies.

References

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