

## Research Article

### Risk Factors of Equine Colic and Series of Cases in Al Wathba, Abu Dhabi-United Arab Emirates

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#### Abstract

The aim was to review the risk factors of colic and series of cases in Al Wathba, Abu Dhabi, UAE. A hospital-based case study was conducted at the SHS Veterinary Center for a 1-year period (Sept-2018/Nov-2019). The investigated parameters were obtained from history medical records, from questionnaires, a clinical examination was performed, a diagnosis of the cause of colic was made and the medical treatment was performed. A descriptive statistical analysis was performed (calculating the mean, median, standard deviation and variance, with presentation of percentage of clinical history question, clinical examinations and physiology parameter, and incidence of colic, medical treatment, surgical and mortality. A total 115 cases of colic in horses were described, 85% was recovered with medical treatment, 3% were referred to surgery and mortality was 11%. In conclusion: the higher cause of colic in horses was the low availability of water, the second cause the ingestion of sand, the third cause management conditions that include management such as abrupt changes in the diet (quantity, food and hay), horses under stress conditions, stable change, transportation, and changes groomer, changes of owners and trainer and medications. The identification of risk factors represents an important objective for the prevention and reduction of the incidence of colic in Al Wathba, Abu Dhabi-UAE.

**Keywords:** Colic; Equine; Horses; Risk factors

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#### Introduction

Colic is a general term that refers to abdominal pain in the horse [1]. However, diseases of other structures within or associated with the abdomen, such as kidneys, liver, uterus, and peritoneum, may also result in signs of colic. Colic is one of those emergency crises that horse owners seek to avoid [2]. Colic is the most common reason for emergency veterinary treatment, and a major reason for death or euthanasia across a range of international studies [3-5]. Equine colic occurs worldwide, for cases of equine colic recognized in the field, as distinct from those referred for specialized treatment, the incidence rate ranges between 3.5 and 10.6 cases per 100 horse years, although individual farms can have rates as high as 30 or more cases per 100 horse years [6]. Based on information from the National Animal Health Monitoring System (NAHMS) Survey, for every 100 horses, there will be 4.2 colic events every year. 1.2 percent of these events will be surgical, and 11 percent will be fatal. There were no differences in colic incidence rates among geographic regions in USA [7]. Owners of horses in the UK report annual prevalence of colic, as a proportion of all health concerns, of 2.1% to 5.6% [6]. The inclusive percentage of operations with one or more colic events was 16.3 (SE=2.2), overall, 1.4 percent (SE=0.6) of colic events resulted in surgical intervention. Estimates using a population of insured horses in Japan identified an annual incidence rate for colic of 18.6% (of ~45,000 horses) [6]. The case fatality rate for all colic events was 11.0 percent (SE=2.8) [7]. Mortality from colic is estimated to be between 0.5 and 0.7 deaths per 100 horse years in the United States and 0.7% in Japan, representing 28% of overall horse deaths (2.5 deaths per 100 horse years) in both populations, the case-fatality rate is 6% to 13% of field cases, although a lower rate of 3.6% is reported for insured horses in Japan [6]. Colic is responsible for more deaths in horses than any disease group except for old age, in the normal farm population, horse mortality from all types of colic was 0.7 deaths per 100 horse-years with a colic case fatality rate of 6.7% [8]. A study of retrospective causes of mortality in Thoroughbred horses in Venezuela showed 36% (189/532) of fatality associated to colic [4]. Colic was second only to old-age as the cause of death, death of horses with colic, the high average cost of care for horses that required surgery, and the number of horses that required surgery contributed to the cost of colic, which was estimated at \$115 million in 1998 [7]. The value of horses lost was assessed at \$70,000,000.00 with total cost to the industry during the year estimated at \$144,000,000.00 [8]. Recent research has shown that approximately one fifth of colic cases that presented in primary practice are critical (requiring intensive medical care, surgery, euthanasia or that result in death), and up to 16% of cases that present with colic are euthanased or die, highlighting that colic is a major health and welfare concern in the horse [3]. Colic is one of the most common causes of death in horses, although the prognosis today is far better than it once was, this is largely due to improvements in the way in which we diagnose and treat colic, better anaesthetic drugs and monitoring and improved surgical techniques. In the literature there are poorly reports of the incidence and prevalence of colic in

the Middle East. Under this important area of study, the aim was to review the risk factors of colic and series of cases in Al Wathba, Abu Dhabi, UAE.

## Materials and Methods

### Data collection

A hospital-based case study was conducted at the SHS Veterinary Center, Al Wathba, Abu Dhabi, UAE for a 1-year period (Sept-2018/Nov-2019). The investigated parameters were obtained from history medical records (individual factors, duty of the horse, deworming, change in diet and water intake), from questionnaires (breed, years old, weight, time start colic, diet food quantity, diet time, fodder time, diet hay quantity, water consumption, place shaving, place sand, eating sand, dental vet check, deworming, probiotics in diet, recent training, recent race, recent travel, previous medication, previous vet attention, previous colic).

### Clinical examination

This procedure described systematic attention to colic was performed for all cases.

1. Clinical history: considering clinical signs observation time, diet (feed and quantity, time), fodder (type and quantity), water consumption, previous treatment (attention by another veterinarian).
2. Observation of behavior in the box and paddock.
3. Physiological parameters: capillary refill time, an evaluation of the mucous membrane color, dehydration, Cardiac auscultation (heart rate), respiratory (respiratory rate) and abdominal (intestinal motility).
4. Transrectal palpation.
5. Gastric lavage (naso-esophageal intubation).
6. Straight-colon lubrication with paraffin.
7. Centesis cecum and colon.
8. Urogenital probe.
9. Medication: FlunixinMeglumine: Furosemide and Xylazine, Physiological solution (Ringer lactate/Normal Saline) and duplehalyte.
10. Observation in hospitalization (evolution and refer to abdominal surgery).

### Statistical analysis

A descriptive statistical analysis was performed (calculating the mean, median, standard deviation and variance, with presentation of percentage of clinical history question (Table 1), clinical examinations and physiology parameter (Table 2), and incidence of colic, medical treatment, surgical and mortality (Table 3).

## Results

In total 115 horses with colic was treatment during the study period. A higher incidence of colic was observed in Arabian horses, followed by mixed-breed horses, Thoroughbreds and finally other breeds (such as Australian Stock, Argentine Pure Breed, and Percheron). Time to start the colic was 7 hours, because in most of the stables, once the horse with colic has been identified, medication (analgesics and normal saline) is applied in a 87%, and previous private vet

15%, include walk the horse in the stable or walk machine for 1-2 hours and in some cases they turn to private veterinarians for their attention and if they respond to the treatment they are referred to the hospital. The medication represented a great challenge since 87% of the horses were previously treated. Colic-associated horse mortality coincided with horses referred to the hospital between 9-72 hours of onset of colic, including trans-surgical and post-surgical mortality. The identification, diagnosis and treatment time is an important risk factor in the prognosis and evolution of the equine colic in Al Wathba. The food included the food quantity 6.9kg, hay quantity 7kg and the availability of water 27liters. Only 38% of the stables included in this study have cold water during the summer period, this could represent a significant risk of colic during the summer. In most of the stables an amount of food is administered, there is and similar water for all horses, they do not consider the weight of the horse, to determine the amount of food required by the horse's body weight, this common practice in the stables can predispose colic's. The 94% of the box or paddock are sand, while 6% of the boxes are shaving, including ventilation with emphasis on the summer period. The behavior of some horses with the ingestion of sand 61% due to deficit of salt and minerals in the diet, or due to behavioral disorders, this represents one of the main causes of colic in horses due to impact and obstruction in the horses studied, it is common observe horses that consume sand and feces approximately 15%, only 42% consume commercial probiotics in the diet, oil and sand free in their daily diet to prevent colic.

Clinical history (question)	Results
Breed	Arabian 55% Mixed breed 38% Thoroughbreds 5% Others breeds 2%
Years old	88% ≥ 7 years old ≤ 12% Mean: 6.7, SD: 3.1, Variance: 9.9
Weight	75% ≥ 495Kg ≤ 25% Mean: 495, SD: 100.32, Variance: 10066
Time start colic	89% ≥ 7 hours ≤ 11% Mean: 6.6, SD: 13.1, Variance: 171.79
Diet food quantity	68% ≥ 6.9Kg ≤ 32% Mean: 6.9, SD: 2.1, Variance: 4.4
Diet time	90% ≥ 8hours ≤ 10% Mean: 8.3, SD: 1.5, Variance: 2.3
Fodder time	90% ≥ 8hours ≤ 10% Mean: 8.3, SD: 1.5, Variance: 2.3
Diet hay quantity	61% ≥ 7.0Kg ≤ 39% Mean: 7.0, SD: 2.2, Variance: 5.11
Water consumption	45% ≥ 27liters ≤ 55% Mean: 26.5, SD: 13.7, Variance: 3.71
Place shaving	10% Yes/No 90% significant CI=95%
Place sand	94% Yes/No 6% significant CI=95%
Ventilation	Air Conditioner: 18% Fan: 78% No applied: 4%
Eating sand (Behavior)	61% Yes/No 39% significant CI=95%
Dental vet check	37% Yes/No 63% significant CI=95%
Deworming	26% Yes/No 74% significant CI=95%
Probiotics in diet	42% Yes/No 58% significant CI=95%
Recent training	87% Yes/No 13% significant CI=95%
Recent race	27% Yes/No 73% significant CI=95%
Recent travel	19% Yes/No 81% significant CI=95%
Previous Medication	87% Yes/No 13% significant CI=95%
Previos Vet attention	30% Yes/No 70% significant CI=95%
Previos colics	21% Yes/No 79% significant CI=95%

**Table 1:** Results clinical history (question).

Clinical Examinations	
Behavior	Pain acute: 83% Pain responsive to analgesic: 95% Pain not responsive to analgesic: 5%
Mucous Membranes	Paled: 27% Red: 66% Capillary refill: 47% $\geq 3$ seg $\leq 53\%$ Dark blue: 7%
Heart rate	Mean: 56.4, SD: 11.56, Variance: 133.84
Breathing rate	Mean: 26.6, SD: 5.09 Variance: 25.96
Temperature	Mean: 38.73, SD: 1.41 Variance: 2.00
Abdominal Sounds (Borborygmi)	Atony (Ileus): 5% Hypoperistalsis: 81% Hyperperistalsis: 14%
Transrectal palpation	Intestinal distension: 38% Displacement cecum: 18% Displacement colon: 10% Impactions: 32% Enteroliths: 2% Fecal production: (diarrhea): 33% / low: 47% / Stool mucus 20%
Gastric lavage	Overloading grains: 41% Overload grass: 17% Overload sand: 37% Nasogastric reflux: 5%
Centesis cecum and colon	Cecum: 25% Colon: 11% Don't Applied: 64%
Urogenital probe	Male: 16% Female: 6% Don't Applied: 78% Urine production: Normal: 75% /Low: 25%
Medication	Sedation: 3% Analgesic: 97% NSAID: 97% Mucoprotectors: 25% Normal Saline: 45% Parafine Transrectal: 88% Don't Applied: 3%
Ancillary Aids	Clinical Lab 15% Ultrasonographic: 5% Peritoneal fluid: 15% Don't Applied: 80%
Hospitalization	8 hours: 63% 12 hours: 12% 24 hours: 9% 72 hours: 6% 120 hours: 10%
Recurrent colic	7%

**Table 2:** The results clinical examination and physiological parameters.

The clinical examination was systematic for the diagnosis of colic. Acute pain behavior was observed in 83%, only without 5% response to treatment, which coincided with cases of gastric reflux (5%) and referred to surgery, the heart rate was on average 56%, abdominal sounds were hypoperistalsis in 81%, 37% of the cases were associated with impact of sand in stomach, caecum and colon 32%. Overload by grains was observed in 41%, overload grass 17%, responding favorably to gastric lavage. Ceco-synthesis was performed in 25% of cases and colon-synthesis in 11%, both with the purpose of severe abdominal gas distension, only 1% of cases presented complications secondary infections in skin and subcutaneous tissue that they responded to antibiotic therapy with a favorable evolution. The urogenital probe was performed in 22% of the cases given the distention of the urinary bladder and persistent pain. Only 5% required ultrasound examination and 15% peritoneal tap. Hospitalization for only 8 hours represented 63% while 12% 24 hours and 10% 120 hours. The recurrent colic was 7% that includes two cases of enteroliths that were evacuated without surgical procedure. The clinical examinations results are presented in Table 2.

All horses were evaluated, diagnosed and treated, 85% responded to therapeutics, 3% of the horses were referred to abdominal surgery (50% recovered after surgery and 25% died during surgery and 25% associated with post-surgical complications) and the mortality was 11%. The incidence of colic in horses at SHS Veterinary Center showed in the Table 3.

## Risk Factors of Colic in Al Wathba, Abu Dhabi-UAE Management

Management such as abrupt changes in the diet, changes in food (food and hay), changes in the amount of food and grass, water availability, horses under stress conditions, stable change, transportation (includes short and long trips), personnel changes (groomer), changes of owners and trainer, medications such as (anthelmintics, some pro-kinetic imidocard, among others), increase the risk of colic in horses.

## Dietary management

The dietary management represents a risk factor, the results observed in the history show that the amount of concentrated feed supplied on average per horse was 6.9Kg daily, in two rations with an 8-hour interval, the amount of food should be considered concentrate feed required for a horse must be 2% of its weight, this indicates that for a body weight of 450Kg the amount of food must be 9.9Kg, supplied in 3 portions (morning 3.3Kg, afternoon 3.3Kg and night 3.3Kg), a common practice is to supply the same amount of food for all horses in the stable, regardless of weight, this represents an important risk factor for colic, knowing that there are different breeds that include Arabian horses, mixed horses (with different weights) and Thoroughbred. Food quality (including percent of proteins, carbohydrates and lipids) was not considered in this study. The quantity of hay corresponds to 1.5% of horse weight, for an average horse of 450Kg the amount of hay must be 7.4Kg, the supply of hay, the average weight of the horse was 450Kg however the amount of food supplied was 7 kg, there is a deficit of 400 grams. The supply of hay does not consider the horse's body weight, a common practice in the stables, is to give the same amount of hay for all horses, regardless of breed, size, athletic activity and weight. The type of

Colics	Number of colics	Percent of colics (%)
Medical treatment	98	85.20%
Surgical	4	3.40%
Mortality	13	11.30%
Total	115	

**Table 3:** The incidence of colic in horses at SHS Veterinary Center.

Some aspects such as periodic veterinary check are not performed no deworming in 63%, no dental check in 74%, these aspects may represent a risk factor for the development of colic such as the presence of internal parasites and migration of parasites, as well as an alteration of digestion due to chewing disorders. The clinical history (question) results are presented in Table 1.

hay was not considered, as well as nutritional quality for this study. The availability of water for the fundamental horse and its deficit is the main cause of colic's in Al Wathba, the amount according to the climate is very important, for example during the summer it is crucial in the development of colic's so that consumption is increased and cold water is recommended. The average water consumption was 27 liters, the estimated water consumption in a horse is 5 liters per 100 kg, it meets the requirements, however, given the environmental conditions, the availability of cold and clean water at libitum is recommended. The ration should be daily and should not be modified except for some considerations such as competitions, races or trips, among others. Supplementation with commercial probiotics, oil (20ml daily in the food) and sand free (to reduce the risks of sand consumption) was observed in 42%, it is a common practice to reduce the risks of colic.

### Environment

In the stable environment 94% of the boxes have sand-based beds, and most of the paddock area is sand, however it is a colic risk for some horses with mineral deficits and some behavioral disorders. Sand consumption the second cause of colic after water deficit corresponds to the ingestion of sand with the result of gastric impaction, cecal impaction and colon impaction. A practice in many stables is the use of masks that reduce the risk of ingestion of sand. As mentioned earlier, the use of some probiotics, oil and sand free can reduce the risk of colic associated with sand impaction. Weather: the ventilation is very important Air Conditioner was observed: 18%, fan in 78% and not applied: 4% ventilation, given the desert environmental conditions and humidity in the region. 65% of the colic's occurred mainly in the summer months: July (average 46 ° C., August 46 ° C. and September 45 ° C.), with the average relative humidity climbs to 61%.

### Exercises/Performance

Several studies have shown that digestibility of feed improves with exercise. In 85% the stables at Al Wathba have a walk machine, and horses usually have 1 hour of walking / jogging activity in the morning and 1 hour of walking / jogging late, other flat race horses, endurance, show They have their daily training routine. Some stables have paddock areas that allow horses freely between 10-20 minutes per day. Anecdotal experiences suggest an increase in the incidence of colic in 3 stables associated with failures in the walk machine. As can be seen in the results a higher incidence of colic in recent training 83%, unlike races only 27%. The increase in colic associated with training may be associated with environmental conditions, handling as food and water availability before and during exercise, and perhaps the most important point is the loss of electrolytes or electrolyte imbalance. In the Arab Emirates, the season of races and competitions in all disciplines is carried out during the months of September to March, after the season that coincides with a marked increase in the environmental temperature, an increase in the incidence of colic is observed, this may be associated with the decrease of the exercise.

### Veterinary care

Veterinary care corresponds to emergencies in 75% (includes: colic, wounds, musculoskeletal injuries). Only in 7% of the stables there is a routine examination of the horses that includes sanitary aspects such as semi-annual vaccinations (Tetanus: Clostridium tetani, Equine Herpesvirus 1 and 4 Rhinopneumonitis, and Influenza),

quarterly deworming (26%) in some stable reproduction (36%), and check of teeth (37%). Parasites have been related to an increased colic risk by several studies, which increase with some behaviors of horses that eat fecal matter with sand even due to mineral deficits, very common in recurring colic's which represents 7% of the cases studied and history.

### Pregnancy

Pregnant mares in the late pregnancy had an incidence of 16% and immediately after delivery, with a mortality of 2%. A common practice is Artificial Insemination (IA) in the Arab breed, top Arab stallions are used, however the size of the mare is not considered, so some foals have a large size are big with respect to the abdomen of the mare and predispose it to recurring colic in the last pregnancy.

### Diseases

Some conditions such as fever associated with bacterium infections or hematozoa (Equine babesiosis: *Theileria equi* and *Babesia caballi* or Equine Granulocytic Ehrlichiosis or Trypanosomiasis *T. evansi*) in horses) can cause dehydration and electrolyte loss that increases in the summer, enteroliths are made of magnesium ammonium phosphate and often form around a nidus such as a stone or wire in 2% were evacuated only with laxatives and trans-rectal paraffin. We observed only a case of previous colic associated with gastric adenocarcinoma in a gelding horse of Arab breed of 8 years old. Some musculoskeletal injuries such as fractures with recumbence for long periods and chronic laminitis may predispose the development of colic by gas accumulation and recumbency for a long time. Some behavioral disorders such as: the act of aerophagia likely creates negative pressure in the abdomen leading to movement of bowel into the potential space within the lesser omental sac. Another behavior condition already described is eating sand, coprophagia, as well as walls and wood in the stable and paddock (Crib biting behaviour).

### Age, sex, breeds

The average age of colic incidence in this study was 7 years, however colic can occur at any age (includes foals and old horses). There is some evidence that more colics occur in horses between the ages of two and ten. There was no significant difference in sex 38% females and 62% males (include 55% gelding). Some studies identified breeds: Standardbreds, Thoroughbreds, Arabs, and Warm bloods as having more frequent colics than other breeds, however in this study the predominant races were Arabian horses, followed by mixed-breed horses, Thoroughbreds and finally other breeds this incidence possibly due to the geographical region.

### Discussion

This study has identified a number of factors associated with altered risk of colic in Al Wathba, Abu Dhabi. Many factors have been identified as risk factors for colic in horses in several epidemiological Studies [9]. However, work on risk factors associated with colic in the Middle East is limited. Determining the cause of different diseases that cause colic is problematic since only natural disease has been studied, in some cases the cause may be evident such as in the case of grain overload, or an enterolith but even in these cases the mechanism which initiates the problem is often unknown [10]. The gathering and correct interpretation of client provided patient history allows the clinician to formulate

an appropriate initial diagnostic plan in a timely fashion. Clinical examination findings are then interpreted in relation to the historical information. In one referral center study, there was a significant association between predicted survival and outcome based on clinical impression, and this improved with increased case exposure and clinician experience [11]. According to the literature, the factors that increase the risk of colic are feeding practices (type and quality of food, type and changes of feeding), the intrinsic factors of horses (sex, age and breed), management (type and changes of housing and activity), medical history (a previous colic, administration of a medical treatment) and parasite control (the presence of worms and type of deworming program) [9]. Management represents the most important risk factor for the development of horse colic because it includes: diet, amount of food and grass, frequency, probiotics, water availability, the environment (box, paddock, ventilation, temperature and humidity), exercise/performance and veterinary care (deworming and teeth). The risk factors for colic in Austria were identified for the first time in this study and these increased risk factors were decreased water consumption, high amount of concentrate intake ( $p=0.037$ ), low hygienic quality of hay ( $p=0.027$ ) and high temperature on the arrival date ( $p=0.003$ ) [12]. Changes in feeding management associated with an increased risk of colic were the main finding relating to feed, this include changes in both forage and concentrate, and changes within the previous 2 weeks or the previous 12 months [3]. The main findings of this study related to the management change factors identified in the scoping and systematic reviews, the largest body of evidence related to feeding management, although this spanned a number of different aspects of feeding, and there was again variations in how each was categorized, in the systematic review, high concentrate intake ( $>2.5\text{kg/day}$ ) was identified as a risk factor in three of the studies [3]. These results of the amount of concentrated food ( $>2.5\text{kg/day}$ ) coincide with those observed in our study where 7Kg of food is supplied per day on average; this represents a potential risk factor for colic and is considered as the third cause of colic in Al Wathba. This is consistent with physiological studies that have shown changes in hindgut flora with increasing levels of carbohydrate feeding investigation, including the amount of concentrate related to the size of the horse [3]. Management such as abrupt changes in the diet (quantity, food and hay), water availability, horses under stress conditions, stable change, transportation, changes groomer, changes of owners and trainer, medications such as (anthelmintics, some pro-kinetic imidocard, among others), increase the risk of colic in horses. A change in housing or stabling may also be associated with change in feed and exercise, and therefore there is likely to be interaction between these factors, change in management has long been anecdotally associated with colic, but the evidence from the systematic review supports this [3]. Management changes should be gradual, rational and take adequate time. Management changes should be gradual, rational and take adequate time to prevent colic risks. Avoiding changes or introducing changes gradually should be a key aspect of preventative management to reduce the risk of colic in the horse [3]. In a study in UK report risk factors that provide further evidence to support management approaches to colic prevention, namely the provision of access to grazing, the behavioural risk factors identified (crib-biting/windsucking and weaving) highlight individual horses that may be at higher risk for recurrent colic, and therefore it would seem appropriate that particular attention be paid to their colic prevention strategies (e.g. diet, access to grazing, anthelmintic prophylaxis and dental care) [10]. These results coincide with those

observed in this study where behavior disorders are described as eating sand with an incidence of 61% and as the second cause of colic after water deficit, as well as coprophagia, as well as walls and wood in the stable and paddock (Crib biting behavior). Crib-biting and windsucking behaviour were reported as having a positive association with an increased risk of equine colic in five studies in the scoping review, these were published between 2004-2014, and this had not been reported in previous studies [3]. By determining risk factor the cause may be elaborated, and it is often possible to reduce the incidence of colic be decreasing exposure to the incriminated risk, the amount of risk is stated as the odds that the colic incidence will increase in a group of horses exposed to a particular factor compared to the colic incidence in a group that is not exposed to that factor [8]. The prognosis favorable to veterinary medical treatment with a complete recovery was 85%. Only 3% of the cases studied were referred to abdominal surgery with a result of 50% recovery and 50% mortality (trans-surgical and post-surgical). Approximately 1% to 2% of colic events in the United States and the British Isles result in surgery [6]. Regardless of the clinical examination findings other indications for surgery, in particular unremitting pain may become apparent before laboratory data is available. In these cases, referral for further evaluation or surgery should be undertaken immediately to expedite management of the case [5]. The efficacy of clinical examinations, and hematologic, hemostatic, and serum biochemical assessments to determine appropriate early medical or surgical therapy in Arabian horses with colic have not been well-described [13]. This study only used the laboratory as ancillary aids in 15% of the cases studied. The combination of prolonged PT, increased PDD, and hypofibrinogenemia could be a reliable predictor of survival in Arabian horses with colic, the significant renal and hepatic dysfunctions in nonsurviving horses with colic appeared to be consistent with Disseminated Intravascular Coagulation (DIC) and a grave prognosis [13]. Colic-associated mortality was 11%, this is possibly due to colic identification time, stable medication, care by private veterinarians. The average time in which the horse with colic is referred to the hospital is 7 hours. This represents a limitation in the diagnosis, treatment and evolution of colic in the horse, since many medications can mask the clinical signs, behavior and pain in the horse, as well as time is decisive in other complications such as endotoxic shock, ileo, displacements, intussusceptions torsions, incarcerations, gastric rupture, intestinal rupture and peritonitis with a poor prognosis and low survival rate. Results suggest that the occurrence of colic may not stop, but may decrease with better feed management practices in Austria [12].

## Conclusion

In conclusion, 115 cases of colic in horses were described in Al Wathba, Abu Dhabi-UAE (Sep 2018-Nov 2019), 85% was recovered with medical treatment, 3% were referred to surgery and mortality was 11%. This study is critical in describing the evidence for different risk factors for colic. The causes were identified and the risk factors associated with colic in horses were described. The main cause of colic in horses was the low availability of water, the second cause the ingestion of sand, the third cause management conditions that include management such as abrupt changes in the diet (quantity, food and hay), horses under stress conditions, stable change, transportation, and changes groomer, changes of owners and trainer and medications. The identification of risk factors represents an important objective for the prevention and reduction of the incidence of colic. This enables

horse owners/carers and vets to make evidence based decisions to plan their management and preventative care programmes to reduce the risk of colic, and identifies key areas for educational programmes for horse owners/carers.

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