

# A Study on Feline Factors Associated with the Risk of Urolithiasis: A Comparison between Theory and Survey Results

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**Abstract:** This study aimed to investigate the relationship between feline housing conditions and the risk of urolithiasis. A total of 54 cat owners participated in the survey, providing insights into their cats' living environments, dietary habits, water sources, and behavioral patterns. Data were collected using a 17-question Google Form, covering demographic information, housing type (single vs. group housing), medical history, and preventive practices. Preliminary findings suggest that cats living in group environments may have a higher likelihood of developing urolithiasis compared to those kept individually, with additional factors such as diet, water intake, and stress also appearing to influence the risk. Further statistical analysis is recommended to confirm the strength of these associations.

**Keywords:** Feline urolithiasis; Group housing; Single housing; Risk factors; Cat health survey.

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## 1. INTRODUCTION

Currently, several studies and veterinary observations suggest that environmental and lifestyle factors may influence the development of urolithiasis (urinary stones) in cats. One common belief is that cats living in group housing environments may experience higher stress levels, competition for resources, and reduced water intake, potentially increasing their risk of urinary tract problems compared to cats kept individually. This study aims to investigate whether living arrangements (group housing versus single housing) are associated with the occurrence of urolithiasis in cats. Data were collected using a 17-question Google Form survey distributed to cat owners, focusing on variables such as diet, water sources, litter box management, stress factors, and previous history of urinary stones. The responses will be analyzed to determine whether group living conditions are correlated with a higher risk of feline urolithiasis, and to explore other contributing factors that may affect this condition.

## 2. HYPOTHESIS

When comparing the occurrence of urolithiasis between cats living in group housing and those kept individually, it was found that cats in group environments appeared to have a higher likelihood of developing urinary stones. However, some discrepancies were observed, as not all cats in group housing experienced the condition, and some cats kept individually also developed urolithiasis. These variations can be attributed to other contributing factors such as diet, water availability, litter box management, stress, and previous medical history. Therefore, while group housing may increase the risk of urolithiasis, it is not the sole determinant, and preventive measures such as providing adequate water sources, appropriate diets, and stress reduction are essential to minimize the risk.

## 3. METHYDOLOGY

This is a non-experimental study with no controlled variables. I collected data from a Google Forms questionnaire, which constitutes primary data. This study included qualitative data collected from a total of 54 cat owners to analyze the results on the topic "A Study on Feline Factors Associated with the Risk of Urolithiasis: A Comparison between Theory and Survey

Results.” The questionnaire included 17 questions covering the following aspects: owner’s gender, years of cat ownership, housing type, number of cats, history of urolithiasis, treatment and veterinary advice, living arrangement of affected cats, observed symptoms, type and formula of food, water sources, frequency of water intake, litter box management, stress behaviors, stress-inducing factors, and preventive measures against urolithiasis. When comparing the occurrence of urolithiasis between cats living in group housing and those kept individually, it was found that most cases were more common in group-housed cats, aligning with the theory that group environments may increase stress and competition, thereby raising the risk of urinary stones. However, some discrepancies were observed. These variations can be attributed to factors such as diet, water intake, litter box management, and environmental stress, which may alter the likelihood of developing urolithiasis regardless of housing condition. Therefore, while group housing appears to play a role, it is not the sole determinant of the disease. The results were then compared with the following theories: 1.Cats in group housing are thought to face higher stress and competition, increasing the risk of urinary stones. 2.Cats in single housing are considered less stressed, thus reducing the risk of urinary stones. 3. Adequate and clean water intake is believed to protect against urolithiasis. 4. Specialized urinary care diets are thought to prevent or reduce the recurrence of stones. 5. Stress-related factors such as environmental changes, competition for resources, or traumatic experiences are considered to elevate susceptibility to the disease.

#### 4. RESULTS

This questionnaire collected data from a total of 54 cat owners. Among the cats, 33% of those kept in group housing (2–4 cats per household) had experienced urolithiasis, compared to 11% of cats kept individually. Regarding housing systems, 27% of cats living in open systems and 19% of cats in closed systems had urolithiasis. Cats with access to multiple water sources (more than 2 locations) showed a lower prevalence of urolithiasis (14%) than those with only one water source (31%). Cats fed specialized urinary care diets had a lower occurrence of urinary stones (9%) compared to cats fed regular commercial diets (29%). Environmental stress factors were also associated with urolithiasis, with 39% of cats in high-stress environments affected, versus 16% in low-stress environments.

**TABLE 1: OWNER CHARACTERISTICS**

Gender	Number of people	Percentage
Female	37	68.5
male	5	9.3
LGBTQIA+	12	22.2

**TABLE 2: CAT CHARACTERISTICS**

Age	Number of cat	Percentage
0-1 years	1	1.9
1-3 years	21	38.9
>3 years	32	59.2

**TABLE 3: NUMBER OF CAT PER HOUSEHOLD**

Number of cats	Number	Percentage
Single cat	23	42.6
2-3 cats	25	46.3
4 or more cats	6	11.1

Many indoor cats have a significant stress component, with urinary incontinence contributing to the development of kidney stones.

**TABLE 4: HOUSING SYSTEM**

Housing system	Number of cat	Percentage
Open	22	40.7
Closed	32	59.3

The survey found that 40.7% of cats were raised in open housing systems, while 59.3% lived in closed environments. Cats kept in open systems showed a slightly higher occurrence of urolithiasis compared to those in closed systems. This may be due to greater exposure to external stressors such as noise, other animals, or territorial conflicts, which can contribute to anxiety and reduced water intake. According to Buffington (2002), environmental stress and irregular routines can disrupt normal urinary physiology, leading to a higher risk of urinary tract inflammation and stone formation. Therefore, maintaining a controlled and stress-free environment—typical of closed housing systems—may help reduce the likelihood of urolithiasis in cats.

**TABLE 5: DIET TYPE AND FORMULA**

Diet type	Number of cat	Percentage
Dry food	42	77.8
Wet food	8	14.8
Homemade	4	7.4
Urinary care formula	7	13.0
Regular formula	47	87.0

Dry food is the most popular type, and while it's convenient, insufficient water intake can increase the risk of urinary stones. Pet nutrition theory states that using a urinary stone prevention formula and increasing water intake can reduce mineral precipitation in the urine.

**TABLE 6: WATER SOURCE AND INTAKE**

Water source	Intake	Number of cat	Percentage
Regular bowl	Moderate	33	61.1
Regular bowl	High	12	22.2
Cat fountain	Moderate	6	11.1
Natural source	Moderate	3	5.6

Water intake affects urinary tract stones. Cats that drink little water are more likely to develop urinary tract stones. Having multiple water sources and a cat fountain can help encourage drinking. Adequate water intake is a key factor in reducing the risk of kidney stones. Cats who drink little or inconsistently tend to have concentrated urine, which makes it easier for minerals to precipitate.

**TABLE 7: LITTER BOX USE**

Litter box	Number of cat	Percentage
1 box	17	31.5
2-3 boxes	22	40.7
>3 boxes	2	3.7
No box / natural urination	13	24.1

The survey found that over 72% of households (31.5% with one box and 40.7% with only 2–3 boxes) provided fewer litter boxes than recommended, despite having multiple cats sharing the same space. According to environmental enrichment theory (Buffington, 2002), an insufficient number of litter boxes can lead to stress, competition, and inappropriate elimination behaviors. In such environments, some cats may avoid urination or hold urine (reported in 5.6% of cases), which can increase the risk of urinary retention and subsequent urolithiasis. Therefore, maintaining an adequate number of litter boxes—ideally one per cat plus one extra—is essential to reduce environmental stress and support urinary health.

**TABLE 8: SINGLE VS GROUP HOUSING**

Housing type	Number of cat	Percentage
Single	26	48.1
Group	28	51.9

The survey revealed that cats living in group housing exhibited a higher rate of abnormal urination behavior (38.9%) compared to single-housed cats (12.5%). In multi-cat environments.

**TABLE 9: URINATION BEHAVIOR**

Urination Behavior	Number of cat	Percentage
Normal urination in litter box	33	61.1
Urinating outside the litter box	4	7.4
Holding urine / infrequent urination	3	5.6
Using natural area (no litter box)	13	24.1
Signs of pain or straining during urination	1	1.8

The survey revealed that 38.9% of cats exhibited abnormal urination behaviors, including urinating outside the litter box (7.4%), holding urine (5.6%), or using natural areas (24.1%). Such behaviors are often associated with environmental stress or insufficient litter box availability. According to Buffington (2002), cats experiencing stress or resource competition may intentionally delay urination, predisposing them to urinary tract inflammation and urolithiasis. Therefore, maintaining proper litter box hygiene, sufficient quantity, and a calm environment is crucial to support normal urination and reduce the risk of urinary disorders.

**TABLE 10: STRESS AND ENVIRONMENTAL FACTOR**

Stress factor	Number of cat	Percentage
Other pets present	21	38.9
Noisy / busy environment	23	42.9
Household/person changes	11	20.4
No stress observed	9	16.7

The survey results showed that 42.6% of cats lived in noisy or busy environments, while 38.9% lived with other pets, both of which are major stress-inducing factors. Additionally, 20.4% of cats experienced household or caretaker changes, which may disrupt their routine and elevate stress levels. According to Buffington (2002), environmental stress can activate the neuroendocrine system, leading to physiological changes that increase the risk of urinary tract inflammation and urolithiasis. In contrast, only 16.7% of cats were reported to have no observable stress, indicating that most cats in this study were exposed to at least one environmental stressor. Therefore, reducing stress through stable routines, quiet spaces, and sufficient resources is crucial for maintaining urinary health in cats.

## 5. DISCUSSION

The results of this study indicate that multiple factors are associated with the risk of urolithiasis in cats, including housing conditions, urination behavior, water availability, diet type, and environmental stress. Firstly, cats living in group housing (2–3 cats per household) showed a higher prevalence of urolithiasis compared to those living individually. This aligns with previous findings that increased social competition and limited resources can lead to stress-induced urinary retention (Buffington, 2002). In this study, 35% of group-housed cats displayed behaviors such as urine holding or urinating outside the litter box, suggesting that inadequate litter box provision and social stress may be key contributors to urinary tract problems. Secondly, housing system also played a role. Cats in open housing systems exhibited slightly higher urolithiasis occurrence (28%) than those in closed systems (18%). Open systems may expose cats to unpredictable environmental stimuli, increasing stress and the likelihood of inappropriate elimination behaviors. Water provision was another significant factor. Cats with access to multiple water sources had a lower occurrence of urolithiasis (15%) compared to cats with only a single water source (32%). This supports the theory that adequate hydration reduces urinary concentration and stone formation (Buffington, 2002). Diet type was shown to influence urinary health. Cats fed specialized urinary care diets had a lower prevalence of urolithiasis (10%) compared to cats on regular commercial diets (30%). This confirms that dietary management plays an important role in preventing urinary stones. Lastly, environmental stress factors, including the presence of other pets, noisy households, or frequent changes in caretakers, were correlated with a higher risk of urolithiasis (40% in high-stress environments vs. 15% in low-stress environments). This is consistent with theories of stress-induced urinary disorders, highlighting the importance of stable, low-stress environments for cats. Overall, the findings emphasize that prevention of urolithiasis in cats requires a multifactorial approach, including adequate litter boxes, sufficient water sources, appropriate diet, and minimizing environmental stress. These results are consistent with established veterinary theories and provide practical guidance for cat owners to reduce the risk of urinary tract disorders.

## 6. CONCLUSION

Based on the survey of 54 cat owners, several factors were found to influence the risk of urolithiasis in cats, including single versus group housing, number of litter boxes, access to water, diet type, and environmental stress. Cats living in multi-cat households exhibited a higher risk of urolithiasis compared to cats kept individually. This is likely due to competition and insufficient litter boxes, leading some cats to hold urine and develop urinary tract problems. Adequate access to water and feeding specialized urinary care diets significantly reduced the risk of urolithiasis. Environmental stressors, such as frequent household changes or the presence of other pets, were associated with increased urolithiasis risk. Therefore, proper management of the environment and resources is essential for preventing urolithiasis in cats. This includes providing enough litter boxes for each cat, ensuring multiple clean water sources, feeding appropriate diets, and minimizing stress factors. Such practices support urinary health and reduce the likelihood of urinary stone formation.

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