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Feline High Rise Syndrome in the Dhaka Metropolitan Area

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Abstract— **This study was conducted directly at the Teaching and Training Pet Hospital and Research Center (TTPHRC) of CVASU Dhaka, Bangladesh. Cat those who were brought to the teaching and training pet hospital and research center (TTPHRC) were considered to be the reference population. During one month study periods about 34 cats were treated in teaching and training pet hospital and research center (TTPHRC) due to different condition after fall. The affected cats were mostly middle-aged (>6 Months – ≤4 Years). 100% cats fell from the multiple stairs. 82.4% non-neutered, and 85.3% local breed cats are more likely to exhibit high-rise syndrome. The purpose of this study was to clinically and etiologically evaluate frequently encountered cases of cats falling from a height. Bone fractures were diagnosed in 85.3% of the cats. A total of 100% of the cats survived after getting treatment**.

Index Terms— **Feline, High-Rise Syndrome, Dhaka metropolitan**

I. INTRODUCTION

High-rise syndrome (HRS) is the phenomenon of cats falling from balconies and windows of buildings with usually ≥2 stories (Xiang 2018). Feline high-rise syndrome is a group of traumatizing ailments experienced by cats that fall from high-rise open windows or balcony doors or access to rooftops in urban environments (Cohn and Côté, 2020). Cats' desire to play is frequently cited as the primary cause of falls. However, other risk factors for falling include leaping from a balcony or window, tripping when strolling on a balcony or ledge, and pursuing a fly, insect, or bird (Saglam M. et al., 2018).

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Some literature findings indicate that 50% of all the traumas caused by falling from a height are mostly seen in cats (Inanoglu et al., 2013) and Parlak and Arican, 2015 study mentioned that falling from a height is the second most common cause of trauma following traffic accidents. Due to behavioral changes between young and old animals HRS is more commonly observed in young cats (Vnuk et al., 2004, Merbl et al., 2013, Oxley and Montrose, 2016).

High-rise syndrome may cause multiple injuries (Pratschke and Kirby 2002, Lynch 2017). Cats have unique biophysical characteristics that allow them to withstand falls (i.e., gyroscopic righting reflex and limb flexing on landing) (Diamond JM, 1988). It's simple to think that cats are safe and secure wherever they climb because they adore heights and actively seek them out. With their keen claws, cats can typically grasp onto tree branches and wooden surfaces, but it can be more difficult to do so with concrete or plastic (WebMD Editorial, 2023).

Dogs typically suffer fractures to the long bones or damage to the spinal column after significant falls, although cats frequently suffer less severe wounds because they are better able to withstand the force of the fall (Whitney and Melhaff, 1987). Flagstad et al., 1998 study mentioned that after a significant fall, cats frequently have shock, face damage, thoracic and orthopedic injuries, as well as other complications.

Cats with HRS have sporadic reports of abdominal injuries, including pancreatic damage (i.e., traumatic pancreatitis) (Lettow E et al., 1986). When a cat falls, it flips over to land on its feet while gently spreading its legs. This aids in better absorbing the impact of the fall, but if they fall far enough, it may also result in head and pelvic injuries (WebMD Editorial, 2023). HRS causes blunt abdominal trauma may result in bruising and edema as well as severe generalized pancreatitis, pancreatic necrosis, localized obstruction of pancreatic ducts, and peritonitis in cats (Zimmermann et al., 2013). Most cats with high-rise syndrome have a 90% chance of survival if they receive prompt, competent medical care (WebMD Editorial, 2023).

Therefore, the purpose of the current study was to clinically and etiologically evaluation of cats that were brought to the Teaching and Training Pet Hospital and Research Center (TTPHRC) Dhaka under Chattogram Veterinary and Animal Sciences University (CVASU) with complaints of falls from a height.

II. METHODOLOGY

A. Study area and Period

This study has been carried out at Teaching and Training Pet Hospital and Research Center (TTPHRC), Dhaka under

Chattogram Veterinary and Animal Sciences University (CVASU) from 13th May 2024 to 12th June 2024.

B. Study population

A total of 34 cats were included in this study after a fall or jump from a balcony or window, where the owners saw the fall, or where there was a reasonable suspicion that a fall had occurred. Only those cats that fell from the second or higher stories were included.

C. Study design & Data collection

Cat those who were brought to the teaching and training pet hospital and research center (TTPHRC) were considered to be the reference population. During study periods about 34 cats were treated in teaching and training pet hospital and research center (TTPHRC) due to different condition after fall.

The required information for the high rise syndrome was collected directly from the owner of the animal through a structured questionnaire. The questionnaire was filled up by repeated questioning to the owners. The questionnaire includes following information such as: Demographic information (age, sex, breed), patient data (neutered and number of cat), management system (accompany with cat in house, cat proof and number of floors in house) were collected during the study period.

D. Statistical analysis:

To demonstrate clinical and etiological evaluation of feline high rise syndrome, all complied data were imported in Microsoft Excel- 2013 and transferred to STATA 3.5.1 version for statistical analysis.

Figure 1: The picture shows the study area

III. RESULT

According to our statistics, 700 cats were admitted to the teaching and training pet hospital and research center (TTPHRC) on the 13th May 2024 to 12th June 2024 and 4.85% (34 cases) of these cats had symptoms of height-related injuries.

A. Demographic information of cats

A summary of the questionnaire regarding high-rise syndrome for cats brought to the TTPHRC included in the study is presented in below tables.

Table 1: Frequency and percentage of different variables related to demographic information of cats (n=34).

Variable	Co-variable	Frequency	Percentage (%)
Sex	Male	18	52.9
	Female	16	47.1
Breed	Local breed	29	85.3
	Cross breed	3	8.8
	Persian breed	2	5.9
Age	Young (≤6 Months)	12	35.3
	Middle age (>6 Months – ≤4 Years)	22	64.7
	Adult (above 4 years)	0	0

In this study, demographic information like sex, breed, and age of cat were measured (Table-1). Of the cats brought to the TTPHRC, 18 (52.9%) were male and 16 (47.1%) were female. Maximum cats were local breed (Frequency-29, Percentage-85.3%) and lowest were cross breed (Frequency-3, Percentage-8.8%) & Persian breed (Frequency-2, Percentage-5.9%). Here most of the cats were middle age (Frequency-22, Percentage-64.7%) and lowest were young (Frequency-12, Percentage-35.3%).

B. Patient data

Table 2: Frequency and percentage of different variables related to patient data (n=34).

Variable	Co-variable	Frequency	Percentage (%)
Neutered	Yes	6	17.6
	No	28	82.4
Having cat amount	Single	17	50
	Multiple	17	50

Regarding patient data, maximum number of cats were not neutered (Frequency-28, Percentage-82.4%), and neutered cat frequency were only 6 (Percentage- 17.6%). Some cat owners of Dhaka city area rear single cat and some are multiple. In our study, owners having amount of single and multiple cats are equal (Frequency-17, Percentage-50%).

C. Management system in house followed by owners

Table 3: Frequency and percentage of different variables related to management system in house (n=34).

Variable	Co-variable	Frequency	Percentage (%)
Cat-proof house	Yes	18	52.9
	No	16	47.1
Giving accompany to their cat	24 hours	32	94.1
	≤12 hours	2	5.9
Location of house	Single stair	0	0
	Multiple stair	34	100
Causes of fall-down	Tendency to go outside	14	41.2
	Accidental fall	13	38.2
	Tendency to catch bird in balcony	5	14.7
	During fighting with others cat.	2	5.9

High rise syndrome and effective cat proofing establishments are strongly related. The High rise syndrome of cats is increasing as a result of inadequate cat proofing. In this study, the author looked at 52.9% (18) owners who had established suitable cat proof in their homes to prevent cats from falling, while 47.1% (16) owners had not. Maximum owners (Frequency-32, Percentage-94.1%) give accompany to their cat for almost 24 hours while 2 (5.9%) owners give less than or equal to 12 hours. The cats that fell from high rise building, all are multiple stairs building (Frequency-34, Percentage-100%). The causes of fall down, 14 (41.2%) cats had tendency to go outside; 13 (38.2%) cats had accidental falls; 5 (14.7%) cats had tendency to catch birds on balcony; and 2 (5.9%) cats had during fighting with others cat.

D. Consequence after fall

Table 4: Frequency and percentage of different variables related to consequence after fall (n=34)

Variable	Co-variable	Frequency	Percentage (%)
Consequence after fall	Bone fractures	29	85.3
	Paralysis	1	2.9
	Soft tissue injury	2	5.9
	No external and internal injury	2	5.9
	Expired	0	0

Of the cats brought to the TTPHRC, 29 (85.3%) had bone fractures, 1 (2.9%) had paralysis, 2 (5.9%) had soft tissue injury, and 2 (5.9%) had no external and internal injury and no cat had expired in our study period.

IV. DISCUSSION

When there are towering structures in metropolitan areas, high-rise syndrome might emerge (Papazoglou et al., 2001). The cats that were brought to TTPHRC with complaints of falls from a height in the Dhaka city area were therefore evaluated clinically and etiologically for this study.

A. Demographic information of cats

HRS was not significantly correlated with gender. According to Papazoglou et al. 2001, there were 51% male, 46% female. In our study, 52.9% were male and 47.1% were female.

Breed can have an impact on a cat's behavior, such that some breeds – for example, Persians – are less active (Bradshaw JW. 2012) than others like local breed. In our country, many families rear local cat mostly, and they are very playful. That's why in our study local breed cats were high in numbers in the fall (Frequency-29, Percentage-85.3%).

Middle-aged (>6 Months – ≤4 Years) cats are more likely to exhibit high-rise syndrome, mostly caused by behavioral variations between middle-aged and adult animals. When playing (chasing a bird, a butterfly, or romping around with other kittens), middle-aged cats often fall from balconies and windows, or they trip and fall when walking on the balcony or window rim. Cats may easily access balconies and windows if they are left open. Previous studies suggested that HRS may increase with age and that this may be more closely related to learned experience (Vnuk et al., 2003; Papazoglou et al., 2001). Regarding cats with HRS, in our study, the mean age of cats was found to be middle-aged (>6 Months – ≤4 Years) cats. Results of previous studies (Vnuk et al., 2003; Papazoglou et al., 2001) and those from our study confirm that there may be a relationship between falling from a height with age.

B. Patient data

Male cats, especially unneutered ones, have a tendency to be more aggressive and territorial than female cats. Their raucous temperament, willingness to roam, and propensity to mark their territory with urine are well recognized. Compared to female, male frequently have a relaxed demeanor and might be more lively and outgoing. Female cats can go into heat multiple times a year, especially if they aren't spayed. During this time, they exhibit a variety of behaviors including increased affection, excessive meowing, and spraying. They tend to be more independent outside of these times and may not need as much care as their male counterparts. Also more volatile and prone to mood swings are female (southwest journal, 2023). In our study, maximum number of cats were not neutered (Frequency-28, Percentage-82.4%), and HRS has found high in non-neutered cats. According to Papazoglou et al. (2001), there were 1% castrated male and 1% spayed female. In our study, regarding having cat amount has no relation with HRS.

C. Management system in house followed by owners

Cats can also be kept in with the use of fencing that has been specifically made to contain cats in spaces like high rise building floors. In this study, the author found no significant relation with HRS. In our study, we found at 52.9% (18) owners who had established suitable cat proof in their homes to prevent cats from falling, while 47.1% (16) owners had not.

In our study, those owners give accompany their cat almost 24 hours in their house, HRS also occurred in maximum number. The cats that fell from high-rise building, all are from multiple stairs building (Frequency-34, Percentage-100%).

In our study, causes of fall down were maximum in those cats that had tendency to go outside 14 (41.2%), then accidental falls, tendency to catch birds on balcony and during fighting with others cat respectively. Maximum injury was bone fractures in our study (Frequency-29, Percentage-85.3%) for variable consequence after fall.

From this study we found that middle aged unneutered local breed cat that are rear in multistoried building whose tendency to go outside are more prone to high rise syndrome. Due to HRS they faced multiple health injuries. The study underlines the significance of efficient cat proofing techniques are lowering feline high rise syndrome occurrences. The presence of a companion, the type of building, and an awareness of the causes of falls are essential in resolving this problem and assuring feline safety in high-rise settings.

V. CONCLUSION

The purpose of this study was to assess cats presented to TTPHRC with complaints of falls from a height in the Dhaka area clinically and etiologically. HRS has recently spread out in the Dhaka area with an increasing cat population. From our study we found that middle aged (>6 Months – ≤4 Years) unneutered local breed cat that are rear in multistoried building whose tendency to go outside are more prone to high rise syndrome. Due to fall from height they faced multiple health injuries. As a conclusion the presence of a companion with pet, the type of building with adequate cat proofing the house, and an awareness of the causes of falls are essential in resolving this problem and assuring feline safety in high-rise settings.

LIMITATIONS

There were some flaws in this research. The study period was limited and the study area was limited. As a result, the findings may not be representative of the entire country.

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Conflict of interest

The authors declare no conflict of interest, financial, or otherwise

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