

## Impact of Kite String Injuries and Temporal Variation in Type of Injuries/Illness of White Rumped Vultures of Central Gujarat

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### Introduction

India has nine species of old world vultures from five genera of which seven species (four genera) are resident and two species (two genera) are winter migrants. Populations of three resident *Gyps* species namely White-rumped Vulture (*Gyps bengalensis*), Indian Vulture (*Gyps indicus*) and Slender-billed Vulture (*Gyps tenuirostris*) are endemic to South Asia have collapsed by over 99% since the mid- 1990s (Prakash *et al.* 2003; Green *et al.* 2004; Prakash *et al.* 2007) and are continuing to decline at an alarming rate (Prakash *et al.* 2007; Green *et al.* 2007). They are at high risk of global extinction, listed as critically endangered (IUCN 2004). Categorized under Schedule I of Indian Wildlife Protection Act 1972; 2002 (Amended). The prime cause for

the decline of these three species is a veterinary non-steroidal anti-inflammatory drug Diclofenac Sodium (Oaks *et al.* 2004; Shultz *et al.* 2004; Swarup *et al.* 2007). Despite a ban in veterinary sector since 2006, the spillover of human Diclofenac multidose formulations into the veterinary sector continues to be major threat (Shah *et al.* 2011). Vultures play an important role in the ecosystem by scavenging on dead animals. The sharp decline of vultures in India has impacted livestock carcass disposal, increase in disease and sky burial of Zoroastrians (Pain *et al.* 2003).

Gujarat still holds a sizable population (around 1000) of *Gyps* vultures mainly White-rumped Vultures (Pandey *et al.* 2010). The central Gujarat region surrounding Ahmadabad is a very important breeding area for White-rumped

Vultures. The population of White-rumped Vultures in Ahmadabad has been monitored since 1999 and this work has been expanded in various other White-rumped Vulture colonies surrounding Ahmadabad in recent years. An established network of local nature enthusiasts keeps regular watch on these colonies (Ahmadabad, Mahesana and Anand districts) which currently holds a population of around 200 White-rumped Vultures and over 60 nesting pairs (author observations 2011-12).

The Kite Flying Festival known as *Uttarayan* is one of the most widely celebrated social festivals in Gujarat. It is celebrated on 14<sup>th</sup> – 15<sup>th</sup> of January and involves people from all religions and age groups. The enthusiasm of flying and cutting kites leads to kite flying being extended from late November until mid-February. The use of “manja”, the abrasive strengthened threads made out of powdered glass, rice/glue paste and colouring mix, turn the sport into a major threat to all flying animals and human health. Traditionally, the threads were made of cotton, easily cut and degradable, but lately, the use of nylon string (being imported from China), which is more resistant and powerful, has gained preference. Ahmadabad alone takes toll of

3000 birds every year including vultures.

Intensive rescue operations during the kite flying festival are carried out at Jiv Daya Charitable Trust with the help of over 50 NGO and 2000 volunteers. Jiv Daya Charitable Trust is an animal welfare NGO located in Ahmadabad. It has got state of the art medical facilities such as a gaseous anaesthesia machine, X-ray machine, sterile operation theatres, intensive care unit and well managed aviaries.

The established rescue network helps us to rescue vultures round the year apart from the kite festival. The rescue operations have been carried out since 2005, but since 2007 it has been improved a lot. In total, 108 White-rumped Vultures have been rescued from Ahmadabad and surrounding areas between January 2009 and August 2012 and treated at Jiv Daya Trust. A database of all rescued vultures has been maintained since 2009. Here we try to analyse the patterns of injuries and illnesses and their relation to survival rates of rescued vultures.

## Materials and Methods

We have maintained the database of vulture rescues and mortalities since 2009. All possible vulture case sheets and necropsy reports were also collected from archives of Jiv Daya Trust. We were also personally involved in numerous vulture rescues, surgeries and necropsies; monitoring the nesting colonies of White-rumped Vultures at Ahmadabad, Kadi (Mahesana District) and Daslana (Ahmadabad District). These personal observations were used to

relate the rescue pattern with the vulture breeding and dispersal patterns.

## Results and Discussion

Injuries caused by Kite Strings (KSI), dehydration and visceral gout have been the major causes of rescues/mortalities in Ahmadabad and the White-rumped Vulture (WRV) colonies in the surrounding areas (Muralidharan *et al.* 2010; Roy 2011). A total of 108 live/dead WRVs have been rescued between 1<sup>st</sup> January 2009 and 8<sup>th</sup> August 2012 (Table 1).

**Table 1:** WRV rescues between Jan 2009- Aug 2012

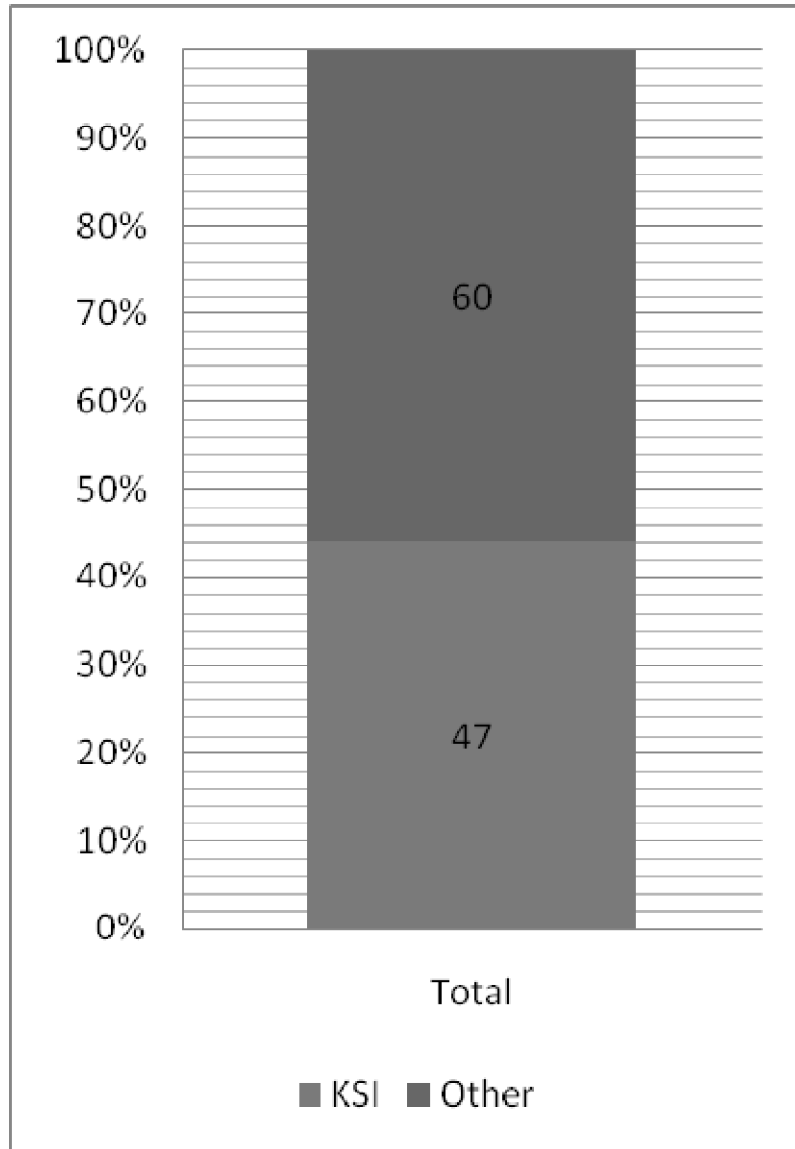
Place	Number
Ahmedabad	89
Daslana	3
Kadi	12
Khambhat	1
Mahuva	1
Surat	1
Dumana	1
Total	108

As shown in Figure 1 the reason for the rescue of vultures in 47 cases (43.92%) was KSI, whilst 60 cases (56.08%) were from other

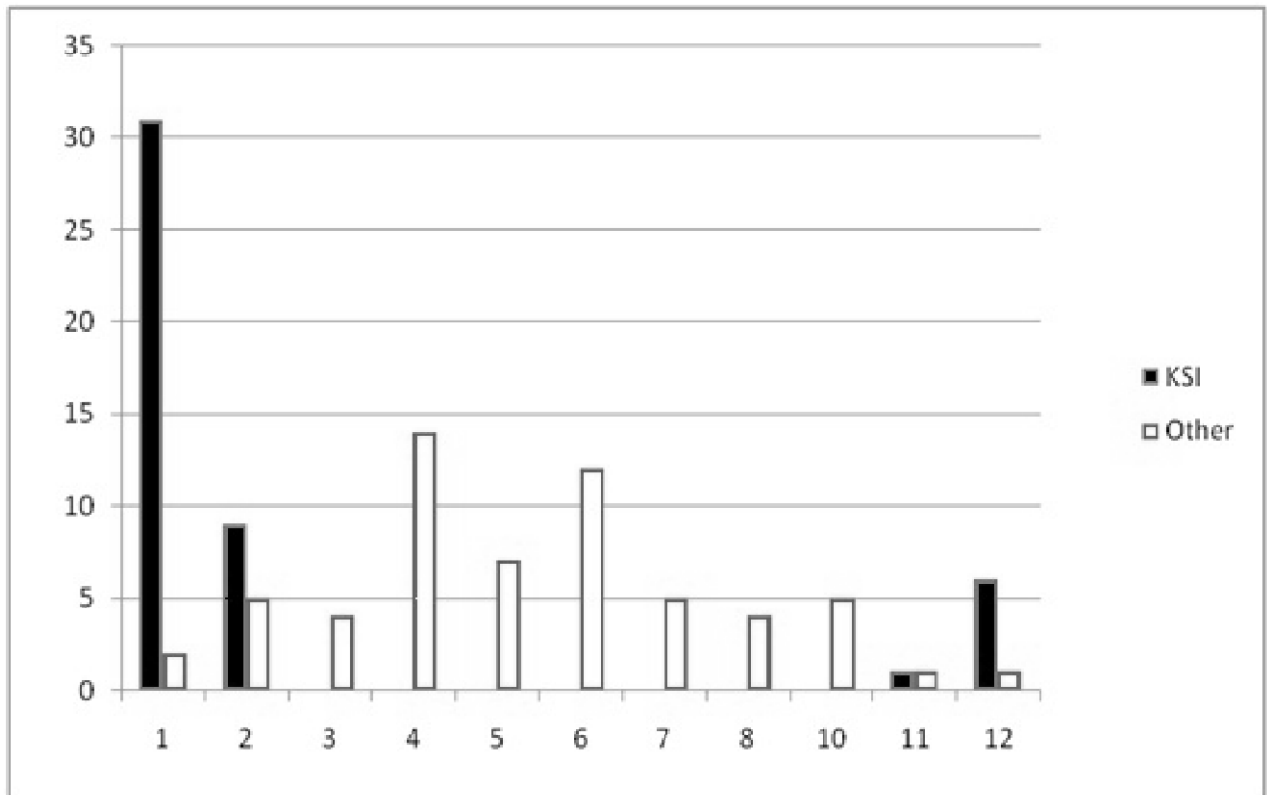
causes such as dehydration, visceral gout and other illness. The KSIs occur at a maximum in January on the 14<sup>th</sup> and 15<sup>th</sup>, which

are the main days of kite festival. However, people fly kites from December to February and the

general pattern of KSIs is shown in Figure 2.



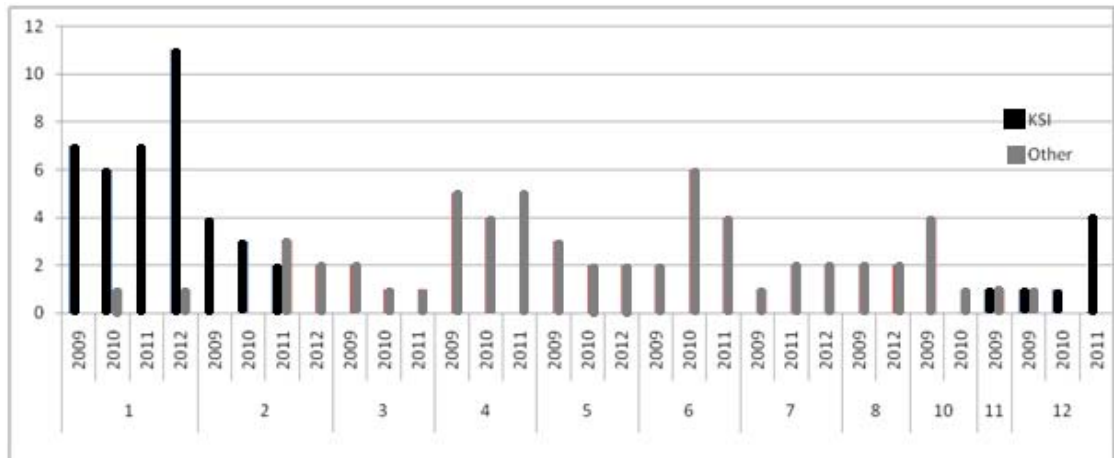
**Figure 1: Reasons of Rescue**



**Figure 2:** Month-wise variation in number of rescued vultures

The wind is directly related to amount of kite flying and hence annual variations in month wise KSI can be seen (Figure 3). December 2011 shows more KSI compared to February 2012, which is not the case in the 2009-10 and 2010-11 seasons where February had a higher number of KSIs

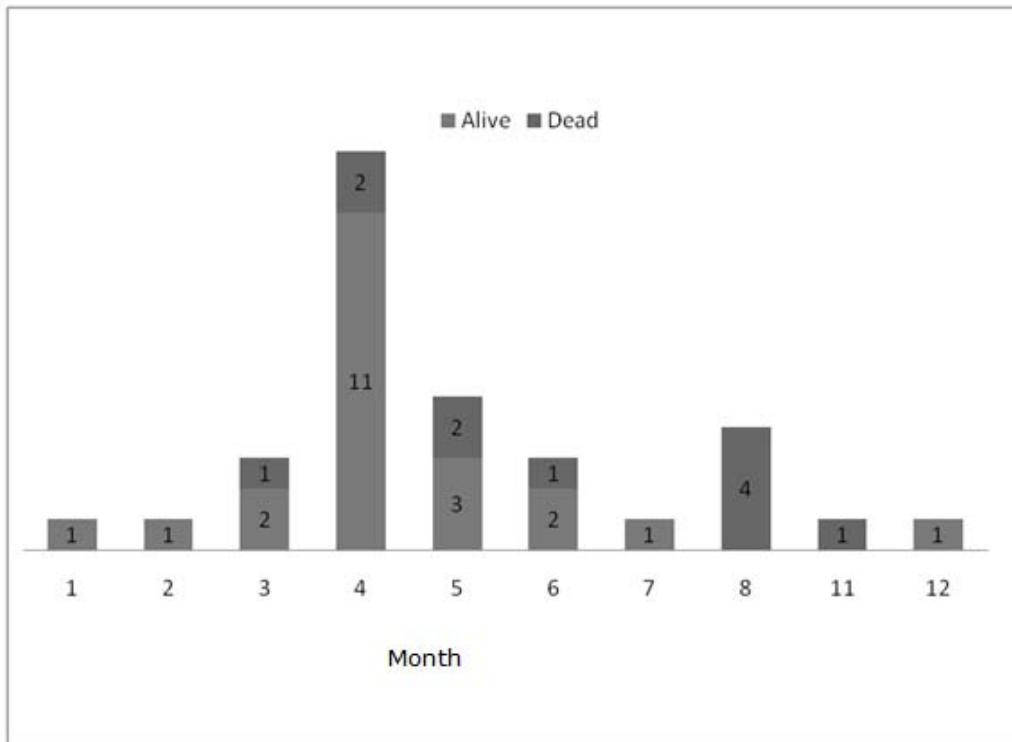
compared to December. November is very rarely having KSI due to much less kite flying at this time. The KSI vultures that are rescued towards the end of February are also due to the strings that become entangled in the trees and around nests.



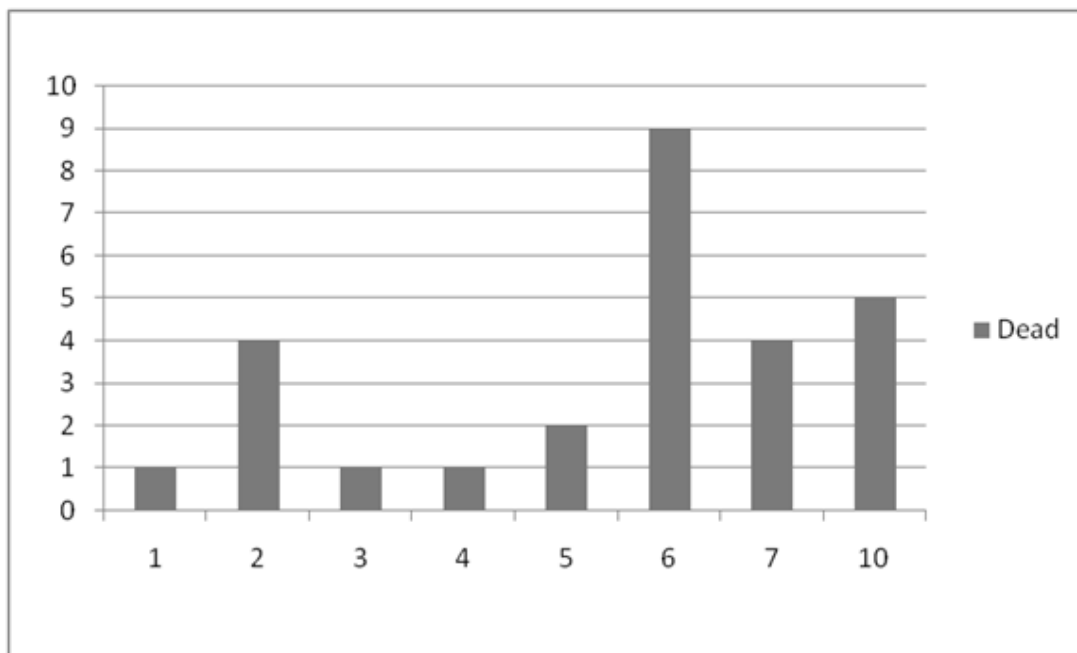
**Figure 3: Year-wise monthly rescues**

As discussed earlier over 55% of rescues are due to dehydration, visceral gout and other illnesses. The dehydration cases mainly come in March to May with maximum in April (Figures 4 and 5). The higher number of rescues in summer is linked to temperature and mainly affects juveniles and

sub adults. These vultures are mainly treated with heavy doses of intravenous fluids and recover well. As seen, the rescue of live vultures decreases from May and numbers of dead vultures recovered increase simultaneously.



**Figure 4:** Number of vultures rescued alive from dehydration, visceral gout or other illness (those that that died during treatment are shown in dark)



**Figure 5:** Number of vultures recovered dead from dehydration, visceral gout or other illness

The death rate of rescued live vultures also increases as the season progresses from the summer to the monsoon. This is mainly coinciding with the breeding cycle of WRV. Usually the nestlings leave the nest by April end. The colonies start dispersing after middle of May. During the monsoon when the vultures are dispersed after the breeding season, they get food and water easily at random sites (high cattle mortality & temporary fresh water ponds in monsoon), thus reducing their dependence on traditional and well-monitored *Panjrapol* feeding sites. We have also observed that the vultures are feeding more at such random sites rather than monitored carcass dumps of *panjrapols* in last two to three years, though we have not been able to collect exact data on this. This makes the vultures more susceptible to carcasses containing Diclofenac/Ketoprofen and thus leads to more dead vultures being recovered during this period, as well as more deaths in the rescued vultures due to un-treatable visceral gout.

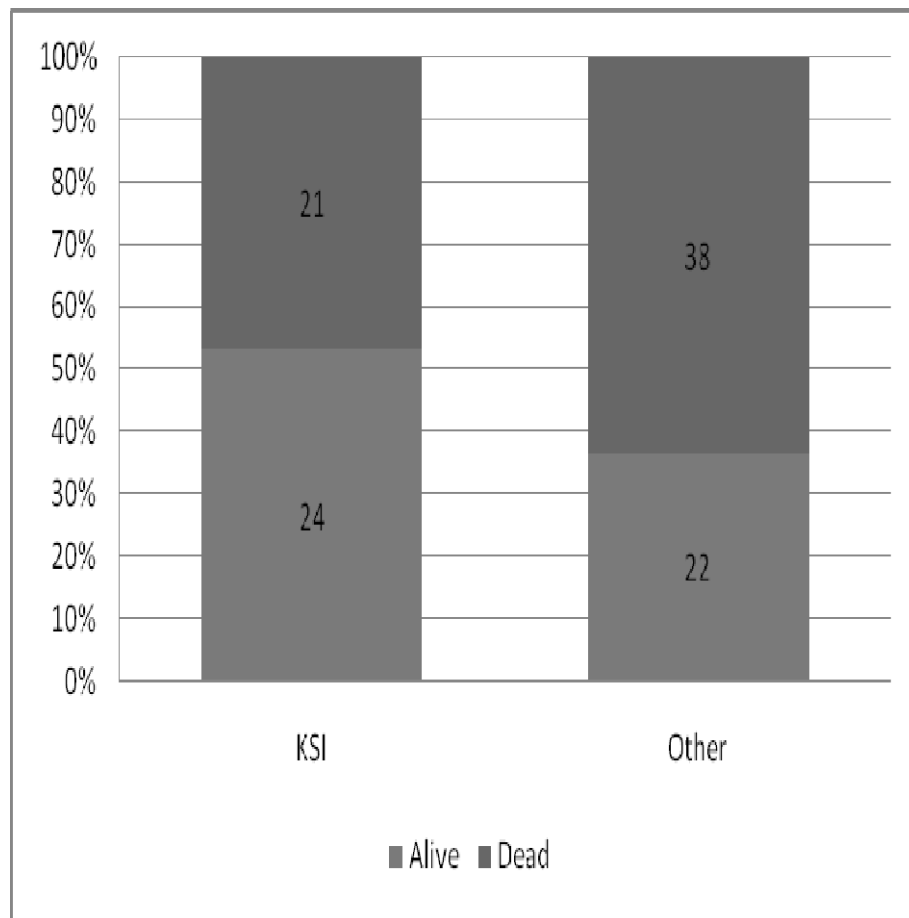
In 2012, four WRV with severe visceral gout were rescued between February and August from Ahmadabad and Kadi colonies. Two severely decomposed WRV carcasses were

found at Daslana and Dumana in May. A total of 27 dead WRV were collected between January 2009 and August 2012, which did not show any signs other injuries. Due to legal permission problems we were not able to perform necropsies on every individual, but the pattern of finding multiple vultures over one to two day periods, severely dehydrated dead bodies and yellowish fluid oozing out of buccal cavity suggested towards gout. This clearly supports the suggested spillover of human Diclofenac formulations into the veterinary sector (Shah *et al.* 2011). The change in the feeding site selection by vultures, the use of human diclofenac in the veterinary sector and the use of ketoprofen are thus becoming serious issues of concern.

#### **Survival Rates in relation to type of injury/illness**

Considering all the recovered birds (including those dead on arrival - DOA) the survival rates are higher in KSI cases (n = 24, 53.33%) compare to other causes (n = 22, 36.67%) (Figure 6). This is due to higher percentage of DOA cases in the other causes category (45%), particularly due to visceral gout, compared to the KSI category (only 2% DOA).

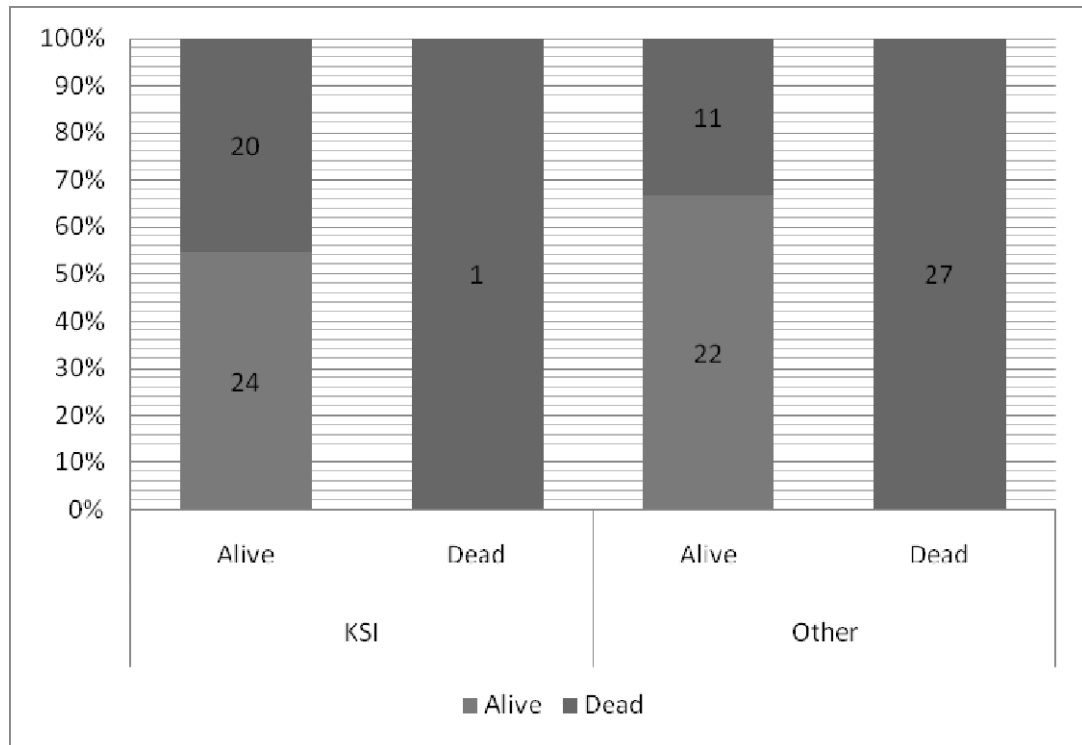




**Figure 6:** Survival in KSI and Other including DOA

If we look at the survival rates in live rescued vultures the situation changes showing a higher survival in other causes (66.67%) compare to KSI (54.55%) (Figure 7). This is mainly because majority of live

rescued vultures without KSI are dehydrated fledglings/juveniles which recover well upon administration in intravenous fluids.



**Figure 7:** Impact of KSI and other on Live Survival and DoA

The live-rescued KSI vultures suffer from severe blood losses, incurable infections and stress, which leads to decreased survival. Thus the majority of deaths from KSI are due to hypovolumic shock, septic shock and stress.

With the use of gaseous anaesthesia, the latest antibiotics, better recovery aviaries and veterinary inputs from across the world we have been able to improve the survival rates compared to past. Here the prevention of death is considered as survival and not necessarily all

the survived vultures are able to fly. KSIs mainly affect the wing, neck and breast region. In many KSI cases, due to severe wounds and infections, we need to go for wing amputations and these vultures become permanently grounded. In the kite festival of 2012 (i.e. from December 2011 to February 2012) six KSI WRV survived out which three had one wing amputated. Almost 50 grounded vultures have been sent to Junagadh and Pinjore vulture breeding centres since 2005 and they have successfully bred, which is the biggest achievement of this whole rescue work. We have also

been able to deploy leg rings and release nine WRV between January 2009 and April 2012.

Due to our well established network we are able to collect most of the injured/dead WRVs from Ahmadabad and Kadi colonies, but we still need to strengthen the networks at Daslana, Dumana and Kahambhat

colonies. We have observed that dead vultures go unnoticed at these colonies and we get totally decomposed bodies, which are useless to detect the reason of death. Kite string injuries and visceral gout remain the major causes of WRV mortalities, which need more profound networking, monitoring and awareness work.

### References:

- Green, R.E., Newton, I., Shultz, S., Cunningham, A.A., Gilbert, M., Pain, D.J., Prakash, V., 2004. Diclofenac poisoning as a cause of vulture population declines across the Indian subcontinent. *Journal of Applied Ecology* 41: 793–800.
- Green, R.E., Taggart, M.A., Senacha, K.R., Raghavan, B., Pain, D.J., Jhala, Y., Cuthbert, R., 2007. Rate of decline of the oriental white-backed vulture population in India estimated from a survey of diclofenac residues in carcasses of ungulates. *PLoS One* 8: e686.
- IUCN, (2004) IUCN Red List of Threatened Species. <<http://www.iucnredlist.org>>.
- Muralidharan, S. and Dhanjayan, V. 2010. Diclofenac Residues in Blood Plasma and tissues of Vultures collected from Ahmadabad, India. *Bulletin of Environmental Contamination and Toxicology* 85:377-380
- Oaks, J.L., Gilbert, M., Virani, M.Z., Watson, R.T., Meteyer, C.U., Rideout, B.A., Shivaprasad, H.L., Ahmed, S., Chaudry, M.J.I., Arshad, M., Mahmood, S., Ali, A. and Khan, A.A. 2004. Diclofenac residues as the cause of population decline of vultures in Pakistan. *Nature* 427:630–633.
- Pain, D. J., Cunningham, A. A., Donald, P. F, Duckworth, J. W., Houston, D. C., Katzner, T., Parry-Jones, J., Poole, C., Prakash, V., Round, P. and Timmins, R. 2003. Causes and Effects of Temporospacial Declines of *Gyps* Vultures in Asia. *Conservation Biology* 17: 661–671.

- Pandey, C. N., Tatu, K. S. and Vyas, V. R. 2010. Status of *Gyps* vultures in Gujarat 2010.
- Prakash, V., Green, R.E., Pain, D.J., Ranade, S.P., Saravanan, S., Prakash, N., Venkitachalam, R., Cuthbert, R., Rahmani, A.R. and Cunningham A.A. 2007. Recent changes in populations of resident *Gyps* vultures in India. *Journal of the Bombay Natural History Society* 104: 129–135.
- Prakash, V., Pain, D.J., Cunningham, A.A., Donald, P.F., Prakash N., Verma, A., Gargi, R., Sivakumar, S. and Rahmani, A.R. 2003. Catastrophic collapse of Indian White-backed *Gyps bengalensis* and Long-billed *Gyps indicus* vulture populations. *Biological Conservation* 109: 381–390.
- Roy A. 2011. Ahmedabad's Vanishing Vultures. *Hornbill*: 38-40.
- Shah, N., Qureshi, Q. and Roy, A. 2011. Micro-level monitoring of Veterinary use of Non-Steroidal Anti-Inflammatory drugs (NSAID) / Painkiller use and its distribution around select vulture sites, Bombay Natural History Society, Mumbai. Pages 1-36.
- Shultz, S., Baral, H.S., Charman, S., Cunningham, A.A., Das, D., Ghalsasi, G.R., Goudar, M.S., Green, R.E., Jones, A., Nighot, P., Pain, D.J. and Prakash, V. 2004. Diclofenac poisoning is widespread in decline vulture populations across the Indian subcontinent. *Proceedings of the Royal Society of London B* 271: S458-S460.
- Swarup, D., Patra, R. C., Prakash, V., Cuthbert, R., Das, D., Avari, P., Pain, D. J., Green, R. E., Sharma, A. K., Saini, M., Das, D. and Taggart, M. 2007. Safety of meloxicam to critically endangered *Gyps* vultures and other scavenging birds in India. *Animal Conservation* 10:192–198.
- The Wild Life (Protection) Act, 1972 as amended upto 2003. Vide Notification No. S.O. 1085(E) dated 30.9.2002.

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