A Lost Cause: Examining Post-release Progress of Rehabilitated Orangutans

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Introduction

- Increased deforestation in Borneo and Sumatra has led to the large-scale destruction of habitats suitable for orangutans.
- Environmental NGOs have responded by sheltering displaced orangutans (mostly orphans) and reintroducing them into the wild.
- This practice is ineffective with survival rates < 50% among released orangutans (Russon, 2009).
- Drawbacks of current rehabilitation practices:
  1. High risk of disease contraction (Herman & Erik, 1999).
  2. Orangutans less wary and fearful of humans, leaving them vulnerable to poachers and more likely to attack tourists (Smith, 2010; Dellatore, 2007; Lardeux-Gilloux, 1995).
  3. Higher infant mortality rates (Kuze et al., 2012).
- Alternative methods of conservation exist, and when determining which strategies should receive funding, the weaknesses of each measure need to be considered.
- This paper evaluates the effectiveness of orangutan rehabilitation by examining infant mortality rates among released orangutan offspring.

Methodology

- Randomized meta-analysis conducted with five observational studies that obtained infant mortality rates of rehabilitant females to find the average infant mortality rate of rehabilitated offspring.
- MedCalc Version 19 was used to calculate the probability of infant mortality among rehabilitants' offspring.
- The random effects model was used due to a significant level of heterogeneity (I^2 = 87.84%) among the studies. This model assumes the studies are different and provides a more conservative estimate.
- After finding the p-value, a two-proportion z-test was employed to determine if there was a difference between wild and rehabilitated offspring.
- Only one study had been conducted on the wild group which found a 6.9% infant mortality rate.
- For this study, the significance level was α = 0.01, H_0: P1 = P2, H_a:P1≠ P2.

Results

- The meta-analysis suggests the average infant mortality rate of rehabilitants' offspring is approximately 30% with a confidence interval from 20.49% to 40.17%.
- Because the p-value of 0.0073 is less than our significance level of α = 0.01, we can reject the null hypothesis.
  - Thus, there is a statistically significant difference between wild and rehabilitated orangutan infant mortality rates.

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Kuze et al., 2008	21	57.143	34.021 to 78.180	2.08	13.37
Galdikas et al., 2013	48	14.583	6.070 to 27.764	4.63	18.42
Anderson et al., 2008	504	22.421	18.851 to 26.317	47.73	25.50
Anderson et al., 2008	440	20.455	16.781 to 24.530	41.68	25.35
Dellatore, 2007	40	55.000	38.491 to 70.741	3.88	17.37
Total (fixed effects)	1053	23.020	20.514 to 25.676	100.00	100.00
Total (random effects)	1053	29.865	20.498 to 40.173	100.00	100.00

Test for heterogeneity

Q	32.8828
DF	4
Significance level	P < 0.0001
I^2 (inconsistency)	87.84%
95% CI for I^2	74.10 to 94.29

Comparison of proportions calculator

Sample 1

Proportion (%): 29.865

Sample size: 1053

Sample 2

Proportion (%): 6.9

Sample size: 29

Test

Results

Difference	22.965 %
95% CI	7.6582% to 28.7002%
Chi-squared	7.186
DF	1
Significance level	P = 0.0073

Discussion

- Results found through the meta-analysis and two-proportion z-test reaffirm the academic consensus: rehabilitated orangutans experience higher infant mortality rates than wild orangutans.
- This presentation closely examined infant mortality rates; however, there are numerous issues with rehabilitation that should be studied.
- Despite being the most costly and energy reliant form of conservation, rehabilitation still yields a significantly high mortality rate.
  - This is cause for concern, and new methods of conservation should be explored.
- Rather than invest in rehabilitation, I suggest resources should be allocated towards habitat restoration programs.
  - Habitat protection and management is far more cost-effective and practical.

Limitations

- To conduct a two-proportion z-test, the following conditions must be met:
  1. The sampling method for each population must be random
  2. The samples are independent
  3. Each sample includes at least 10 successes and 10 failures
  4. Each population is at least 20 times as big as its sample
- Only the first two conditions were met

References

1. Anderson et al., *Journal of Human* Evolution, 2008.
2. Dellatore, Oxford Brookes University, 2007.
3. Galdikas, *Primates*, 2013.
4. Herman & Erik, Kluwer Academic Publishers, 1999
5. Kuze et al., *Primates*, 2008
6. Lardeux-Gilloux, *Springer*, 2012
7. Russon, *Oxford University Press*, 2009