Review: Investigating the relationship between inbreeding and lifeexpectancy in dogs: mongrels live longer than pure breeds

OVER ALL RECOMMENDATION: ACCEPT WITH MAJOR REVISION

Summary:

Overall, the paper discusses the relationship between inbreeding coefficients and lifespan in dogs. The study finds that dogs with higher inbreeding coefficients have a lower lifespan, and the paper differentiates between pure-bred, cross-bred, and mongrel dogs. The paper highlights the limitations of the sample and the need for ethical dog breeding. The review notes that the paper is well-written and provides a clear differentiation between groups that are not pure breeds. However, the suggestions are given below for improvement

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Abstract:

Overall, the abstract provides a clear overview of the research study and its findings. However, there are a few areas where improvement can be made:

- The research question and objective could be more clearly stated in the abstract. The reader should know exactly what the study aimed to investigate before delving into the details.
- It would be helpful to provide more information on the dataset used in the study. For example, where was the data sourced from, and what time period does it cover?
- The abstract could benefit from more detail on the statistical methods used. For example, what factors were controlled for in the Cox regression analysis?

- The abstract could also provide more information on the implications of the findings. For example, what does this mean for dog breeders, owners, and animal welfare organizations?

Here's an example of how the abstract could be revised to address these points:

This study aimed to investigate the relationship between inbreeding and life expectancy in dogs. Using a dataset of 30,563 dogs sourced from [source], we conducted survival analysis and Cox regression proportional hazards modeling to differentiate survivability in three groups of dogs: mongrel, cross-bred, and pure breed. We found that mongrel dogs had the highest life expectancy, followed by cross-bred dogs with only one purebred ancestor, and purebred dogs had the lowest life expectancy. Additionally, we found a significant positive correlation between lifespan and the Genetic Illness Severity Index for Dogs, indicating that higher inbreeding coefficients are associated with higher morbidity levels. These findings have important implications for dog breeders, owners, and animal welfare organizations seeking to promote healthier, longer-lived dogs.

- ✓ Key-words are missing

Manuscript:

Introduction:

Begin by framing the importance of the topic: While dogs have been our faithful companions for thousands of years, their breeding and genetics have been the subject of growing concern in recent times.

- ✓ Provide some historical context: Over the years, dogs have been selectively bred for various purposes, resulting in a diverse array of breeds with unique physical and behavioral traits.
- ✓ Highlight the negative consequences of breeding practices: While this selective breeding has allowed for specialization in various activities, it has also led to the concentration of deleterious genes, which can lead to numerous health problems.

- ✓ State the aim and hypothesis of the study: This study aims to investigate the relationship between inbreeding and lifespan in dogs, hypothesizing that mongrel dogs may have a longer lifespan than crossbred and purebred dogs due to a decrease in the concentration of deleterious genes.
- ✓ Emphasize the potential implications of the study: The findings of this study could help guide breeding practices and ultimately improve the health and welfare of dogs.

Material and Methods:

Overall, the materials and methods section of this paper seems to be well-written and informative. However, here are some suggestions for improvements:

- ✓ It would be helpful to explain more about the data cleansing process. What were the criteria for eliminating outliers?
- ✓ In line 95, it would be useful to explain what is meant by "data transformation for a standard normal distribution."
- ✓ It would be helpful to explain what GISID stands for and what it measures.
- ✓ It would be useful to explain why the authors chose to divide the number of identified disorders by the average scores obtained by the application of GISID.
- ✓ In lines 100-103, the process of eliminating some breeds from analysis could be explained more clearly.
- ✓ It would be helpful to provide more information about the Cox-regression proportional hazards model, such as what other variables were included in the model besides "Type of Dog."

Results:

Overall, the results presented seem to be well organized and clear. However, there are some suggestions for improvement:

- ✓ Provide more context: It is important to provide more context regarding the data being analyzed, the sample size, and the study design. This will help the reader to better understand the implications of the results.

- ✓ Include effect sizes: While the authors provide p-values and significance levels, effect sizes are also important to include in order to fully understand the magnitude of the differences between groups. Including effect sizes (such as Cohen's d, odds ratios, or hazard ratios) would enhance the interpretation of the results.
- ✓ Clarify some terminology: The authors use some technical terminology that may not be familiar to all readers (such as "Ç2" and "Wald"). It would be helpful to clarify these terms or provide a brief explanation for readers who may not be familiar with them.
- ✓ Consider presenting the survival function plot for the second model: While the authors explain that presenting a survival function plot for the second model would be impractical due to the number of breeds included, it would still be helpful to present some visual representation of the results. Perhaps a bar graph or table summarizing the results for each breed could be included.

Discussion:

Overall, the discussion section provides a thorough summary of the study's findings and contextualizes them within the broader literature on dog lifespan and inbreeding. However, there are a few areas where the discussion could be improved:

- ✓ Clarify the limitations of previous studies: While the discussion highlights previous studies on dog lifespan and inbreeding, it would be helpful to clarify the limitations of these studies in more detail. For example, the discussion mentions that the study by Proschowsky et al. (2003) found significant differences between mixed breed and pure breed dogs, but does not provide details on why the lack of post hoc tests makes the results less robust.
- ✓ Provide more information on the study's methodology: While the discussion provides a clear explanation of the study's key findings, it would be helpful to provide more information on the study's methodology, such as how the inbreeding coefficients were calculated and how the sample of dogs attending veterinary practices was selected.
- ✓ Discuss implications for dog breeding practices: The discussion briefly mentions ethical dog breeding practices and cites a study on reducing the frequency of disorders and increasing genetic diversity. However, it would be beneficial to expand on the implications of the study's findings for dog breeding practices in more detail. For

example, the discussion could explore how breeders could use the study's findings to make informed decisions about breeding practices and prioritize the health and welfare of dogs.

- ✓ Overall, the discussion provides a solid overview of the study's findings and their implications for dog lifespan and inbreeding. By addressing these suggestions for improvement, the discussion could provide even greater clarity and insight into the study's contributions to the field.