

# THE EFFECT OF VOLUNTEERING ON STRESS HORMONE LEVELS OF GRADUATE STUDENT VOLUNTEERS

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## Abstract

The purpose of this presentation is to set up methods for a long-term study using graduate students in the Speech Pathology graduate program at Longwood University. Previous studies have shown that levels of cortisol and alpha-amylase, stress hormones, decrease after a volunteering activity. In this study, we aim to replicate those results by taking saliva samples from graduate students who are volunteering with disabled children at a local therapeutic barn, Heartland Horse Heroes. From those samples, we will measure levels of cortisol, alpha-amylase, and DHEA, a hormone measuring resistance. We expect to see a decrease in cortisol and alpha-amylase and an increase in DHEA levels, based on previous research. In this proposed study, graduate students would be tested before and after volunteering in Weeks 1, 5, and 10 of their program. This model will be used in the future to provide significant results for this long-term study.

## Background

In this study, cortisol, alpha-amylase, and DHEA were all measured. The locus coeruleus-sympathetic-adrenomedullary axis (LC-SAM) and the hypothalamus-pituitary-adrenal axis (HPA) are two stress systems that work in tandem. Cortisol and alpha-amylase are the biomarker hormones of these systems. Cortisol is commonly identified as the "stress hormone," and it is the more common hormone. Alpha-amylase is a digestive enzyme that is often found in the saliva as well as the stomach. Dehydroepiandrosterone (DHEA) is another hormone. It helps produce testosterone and estrogen. There are not many sociological studies that have been conducted to do with these scientific hormones. However, one that was found discusses the effects of volunteering specifically physical health, functioning, loneliness, and cognitive functioning on older adults. It was found that overall volunteering does have profound effects such as promoting physical, cognitive, and social engagement. Through this study it was found that associations made were not conditional to the number of hours volunteered which is something that is being looked upon in this current study being conducted. One other study conducted questioned whether or not medication had a decrease in adrenaline and cortisol levels. It was found that the use of meditation did decrease these levels within the body after 48 hours and remained down for up to 8 months. Equine therapy is a form of physical and mental therapy involving horses in many ways, whether with grooming the horses, riding them, or feeding them. Documentation on the use of horses in therapy dates back hundreds of years, and equines have been used in countless programs and therapies over the years.



Figure 1: A therapy horse at Heartland Horse Heroes



Figure 2: This is the resulting plate from the cortisol assay.

## Methods

Step 1: Collect baseline saliva samples

Step 2: Samples taken from graduate student volunteers at the barn before and after volunteering at Week 1, 5, and 10

Step 3: Saliva samples are analyzed for levels of cortisol, Alpha-amylase, and DHEA using assays that require an ELISA protocol

Step 4: Levels of stress hormones are analyzed

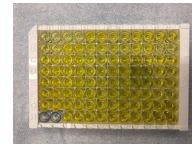


Figure 3: Tray filled with saliva samples after the cortisol assay.

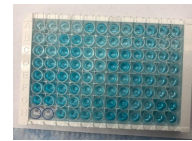


Figure 4: Tray filled with saliva samples after the cortisol assay.

## Results and Conclusions

While the study has just begun there are several baseline findings that were able to be concluded from the first set of tests. It was found that after volunteering DHEA increased concluding that resistance towards stress has also increased. Alpha-amylase also increased while cortisol decreased. There is not enough data to make accurate statements, however, this data is a baseline understanding as this study continues in addition to other similar studies. As this study continues, it is expected to see a continual increase in DHEA levels as well as an increase and alpha-amylase. It is expected for cortisol to decrease due to stress decreasing as volunteering increased. However, further research needs to be conducted before this statement can be proven.

## Future Research

In addition to continuing this research process, there are some other aspects to look at in further research. While this study looked at stress effects on volunteering with equine therapy, it may be interesting to study other forms of volunteering, such as homeless shelters, food kitchens, or senior centers. Another interesting aspect to look into would be stress resilience; a longitudinal study that recorded stress levels over a long period of time in certain individuals.

## References

- Balakrishnan, V. Kamman, V. Lakshmi, A. Karimassery, R., & Harish, K. (2011). Impact of integrated amrita meditation technique on adrenaline and cortisol levels in healthy volunteers. *Evidence-Based Complementary and Alternative Medicine*, (2011). doi: 10.1155/2011/379645
- Lima, P., Calil, C., & Marcondes, F. (2013). Influence of gender and stress on volatile sulfur compounds and stress biomarkers production. *Oral Diseases*, 19(4), 366-373. doi: 10.1111/odi.12011
- Carr, D. (2018). Volunteering among older adults: Life course correlates and consequences. *The Journal of Gerontology: Series B*, 73(3), 479-481. <https://doi.org/proxy.longwood.edu/10.1093/geronb/gbx172>
- Han, S.H., Kim K., & Burr J.A. (2018). Stress-buffering effects of volunteering on salivary cortisol: Results from a daily diary study. *Social Science & Medicine* 201 (2018), 120-126.
- Ponzi D., Muehlenbein M.P., Geary D.C. & Flinn M.V. (2016). Cortisol salivary alpha-amylase and children's perceptions of their social networks. *Social Neuroscience* 11(2), 164-74.