The Effect of Volunteering on Stress Hormone Levels of Graduate Student Volunteers

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Hons 490

Abstract

The purpose of this presentation is to set up methods for a long-term study using graduate students in the Speech Pathology 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 using enzyme-linked immunosorbent assay (ELISA) which detects hormones. When a hormone for the specific assay is detected, the color changes due to the binding with a solid phase substrate. 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," because it is increased in times of stress. Alpha-amylase is a digestive enzyme that is often found in the saliva. Dehydroepiandrosterone (DHEA) is another hormone. It helps produce testosterone and estrogen which help aid in resistance to stress. There are not many sociological studies that have been conducted to do with these scientific hormones. However, the paper by Carr 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. Another paper by Balakrishnan et al., questioned whether or not meditation 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 as used in this research is a form of physical and mental therapy involving horses in many ways, whether 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.

Methods

Figure 1: A therapy horse at Heartland Heroes Horses.

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 with week 10 being the conclusion of the program.

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 2: Dr. C. Franssen assisting with completing the cortisol assay.

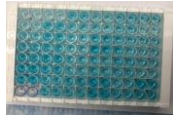

Figure 3: Tray filled with saliva samples before the cortisol assay.

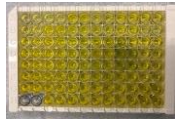

Figure 4: Tray filled with saliva samples after cortisol assay.

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 conducted with the team from Dr. JoEllen Pederson's research group. 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 our 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.

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