**Correlations in Stress Disorders and Autoimmune Disease: A Review**

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**Abstract**

Stress disorders are broadly defined as emotional feelings of detachment or distress caused by a specific event or experience. These disorders can range from short-term ASD (acute stress disorder) to longer term PTSD (post-traumatic stress disorder). Autoimmune disease is the inability of the immune system to recognize self vs non-self (Arakelyan, 2017). Risk of autoimmune disease is shown to be higher in stress-disorder populations (Song, 2018). Resulting evidence shows a strong correlation between ASD/PTSD and heightened chances of possessing an autoimmune disease (Song, 2018).

**Introduction**

Stress and/or anxiety is experienced by nearly all individuals in some shape or form. A large portion of individuals who experience an upsetting loss or trauma will gradually recover, however, this is not always the case. Inability to move on from a specific event or experience can result in a more severe form of stress, PTSD (post-traumatic stress disorder). According to World Psychiatry, PTSD has a variety of negative health effects on the inflicted individual outside of excess stress (McFarlane, 2010). Commonly associated issues include hypertension, cardiovascular disease, diabetes, arthritis, and an impaired immune system, resulting in a variety of autoimmune diseases (Tull, 2019). Autoimmune disease is the result of the immune system malfunctioning by over stimulation against a specific foreign invader, or failure to distinguish between self vs. non-self (Arakelyan, 2017). Inability to distinguish between self and non-self leads to immune system attacks on those specific unrecognized regions, damaging and killing healthy cells (Arakelyan, 2017). In the case of stress-related disorders, immune function may be directly inhibited due to inflammation caused by this stress, resulting in the progression of an autoimmune disease (Song, 2018). The purpose of this study is to observe the relationship between certain stress-associated disorders and autoimmune diseases. Immune system susceptibility and risk of individuals with stress-associated disorders will be compared to individuals without a stress disorder. PTSD comprises the majority of the stress-disorder group in this specific study in comparison to other stress disorders.

**Recent Progress**

In order to study the correlation between diagnosed stress disorders and acquired autoimmune disease, the country of Sweden was observed, and medical records for individuals living in Sweden was collected for conserved data analysis. Research took place from 1981-2013 and included the involvement of not only major Swedish Medical Institutes, but also several from Iceland and the United States. Individuals were split into three main categories, those with a stress-related disorder, unexposed population, and exposed population. The hazard ratios and incidence rates/1000 person-years were observed in each group to compare and contrast.

The total population of Sweden born individuals was shown to be 7,689,628. Individuals with diagnosed stress disorder included 125,896 people. 19,432 of individuals with stress disorders were excluded for varying reasons. Exposed cohort (patients with stress related disorders) comprised 106,464 individuals with 911,730 accumulating over the total time taken, 32 years. Unexposed cohorts comprised 1,064,640 of individuals studied, with an accumulation over time of 9,675,711. Siblings of exposed and unexposed cohort are also shown. The average age of individuals with stress-related disorders was 41 years of age, 40% of these male and the remaining 60% female.

During a 10 year follow-up, patients with any stress-related disorder are recorded to have higher hazard ratios (HR) than the unexposed and sibling population with overall incidence rates/1000 person-years of 9.1 and 6.0, 6.5 respectively.

From 1981-1990, the incidence rate/1000 person-years for patients with any stress-related disorder in comparison to matched unexposed individuals was recorded to be 7.2 and 5.0, respectively. The incidence rate for patients with post-traumatic stress disorder in comparison to matched unexposed individuals were recorded to be 8.5 and 5.5, respectively.

From 1991-2000, the incidence rate/1000 person-years for patients with any stress-related disorder was 8.9 while the incidence rate/1000 person-years for matched unexposed individuals was 5.9. Incidence rate/1000 person-years for post-traumatic stress disorder was recorded to be 9.1, this number for matched unexposed individuals was observed to be 6.3.

From 2001-2013, the observed incidence rate of exposed patients with any stress-related disorder versus matched unexposed individuals were 10.7 and 6.9, respectively. Incidence rate for exposed patients with post-traumatic stress disorder was recorded as 12.8, with matched unexposed individuals possessing an incidence rate of 7.0.

Risk for autoimmune disease was slightly higher in younger stressed individuals with a HR of 1.48 in individuals less than 33 years of age, HR of 1.41 for ages 34-41, HR of 1.31 for ages 42-50, and HR of 1.23 in ages greater than or equal to 52 years of age. HR statistics for patients with any stress related disorder who used SSRIs (selective serotonin reuptake inhibitors) were observed. Individuals who had taken SSRIs for less than 179 days showed HR for acquiring autoimmune disease of 3.64, patients who had taken them for 180-319 days showed HR of 2.65, and patients who had taken SSRIs for greater than or equal to 320 days showed HR of 1.82.

**Discussion**

Statistics of exposed patients (those with PTSD/another stress-related disorder) are shown to have overall consistently higher hazard ratio for acquiring autoimmune disease in comparison to unexposed individuals. As expected, those with a family history of autoimmune disease were also at elevated risk. According to further research, the use of SSRIs by individuals with stress-related disorders slightly decreased the chances the acquiring an autoimmune disease, with higher dosage being the most effective. Data shows that, from 1981-2013, the incidence rate gap of exposed versus unexposed individuals has progressively gotten larger. This is significant because, although science has progressed and more treatments are available, autoimmune disease is even more prominently linked to stress disorders now in comparison to at the beginning of the study in 1981. Both gender and age were taken into consideration during study. No specific correlations were observed between varying genders, however, it was shown that younger populations are more subject to acquiring autoimmune disease in comparison to older populations. Potential errors with experimentation include environmental factors and the fact that some medical facilities may diagnose stress disorders by different standards in comparison to other facilities. This may skew results as some patients may not have a standard diagnosis and be placed in the wrong group. Overall, the results of this study show a strong correlation between the presence of a stress-related disorder and heightened risk of acquiring some form of autoimmune disease over time. This study is important as this correlation could give insight on how the immune system can be compromised through a stress response. It puts on emphasis on the significance of stress (or PTSD) disorders, and could help in the understanding and potential prevention of autoimmune disorders. As inflammation is commonly associated with a large portion of autoimmune disorders, the correlation between these two diseases could provide insight on potential causations of stress-related disorders. Further study could be done to observe patients in varying countries to compare.

**References**

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