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Intro to Ecology and Evolution

The Average Life Span of Males and Females in Pre-1900s, 1901-1950, and Post-1950s in Farmville, VA

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Abstract

Demography is the study of population characteristics, and it seeks to understand the underlying processes for the different characteristics in a population. The alternative hypothesis of the experiment was that there will be a significant difference in the average age of males and females between pre-1901 and post-1950. While in the cemetery, groups of two people traveled around in different sections of the cemetery collecting data from the tombstones. The data that was collected was the person's sex, and their birth and death year. From there, the data was analyzed and put into three categories: pre-1901, 1901-1950, and post 1950. The results from the statistical analysis was that there was a significant difference between the average ages of males and females when comparing pre-1901 and post-1950 deaths.

Introduction

Demography is defined as the study of population characteristics, such as age structures, sex ratio and growth rate. There are four factors that can change the population size, they are immigration, emigration, deaths, and births. In the human population, there are some key factors that can affect the population size. Some of the reasons why the mortality rates were so high before the 1950s was due to at home births as well as Puerperal fever and antisepsis (Loudon, 2000). Historically, most would assume that males lived longer than females. But that is not the case, the female tends to live longer than the males because the males are at a higher risk of heart disease and homicide then females were (Bridget, 2007). In the 1900s, the top three causes of death were as followed: pneumonia and flu, tuberculosis, and gastrointestinal infections. (Tippett, 2014). After much research, I came to the hypothesis that there will be a difference in the average life spans between male and females during the three different time periods.

Material & Methods

Location: The experiment was conducted in the Westview Cemetery in Farmville, VA.

Data Collection: Data was collected from the headstones in a way that newer and older headstones were both recorded. In pairs, the birth year, death year and the sex of the person was recorded down. Each pair was to record one hundred total data points or fifty for female and fifty for male. The types of data that were collected were as followed: females who died before 1901, males who died before 1901, females who died between 1901 and 1950, males who died between 1901 and 1950, females who died after 1950, and finally males who died after 1950.

Data Analysis: The data was then put into one large excel sheet where the average age of males and females was taken. The standard deviation and standard error was also taken and then put into two separate bar graphs. A two-sample t test was then run to find the significant difference between the pre-1901 males and post 1950 males, also the pre-1901 females and post 1950 females.

Results

Life Span: The average life span for the pre- 1900 females was 37.3. For females between 1901 and 1950, the average life span was 56.14. And for the post 1950 females, the average life span was 74.18 (Fig 2). As for the males, the average life span for the pre- 1900 was 41.76. The average life span of the males between 1901 and 1950 was 54.42. And the average life span for the post 1950 males was 67.03 (Fig 1). With the test of significant difference, it was discovered that when comparing pre- 1900 and post 1950 females that $t=-7.196$ $p=<0.001$. And when comparing pre- 1900 and post 1950 males that $t=-9.5085$ $p=<0.001$

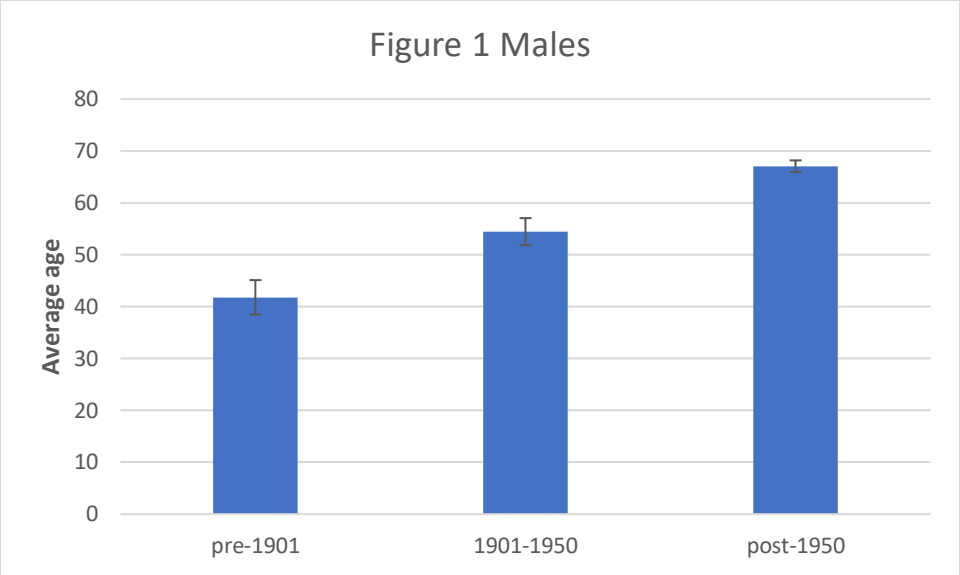

Figure 1. Bar graphs show the average lifespans of males in the three different time periods. Also shown are the standard error bars. t=-9.5085 p=<0.001.

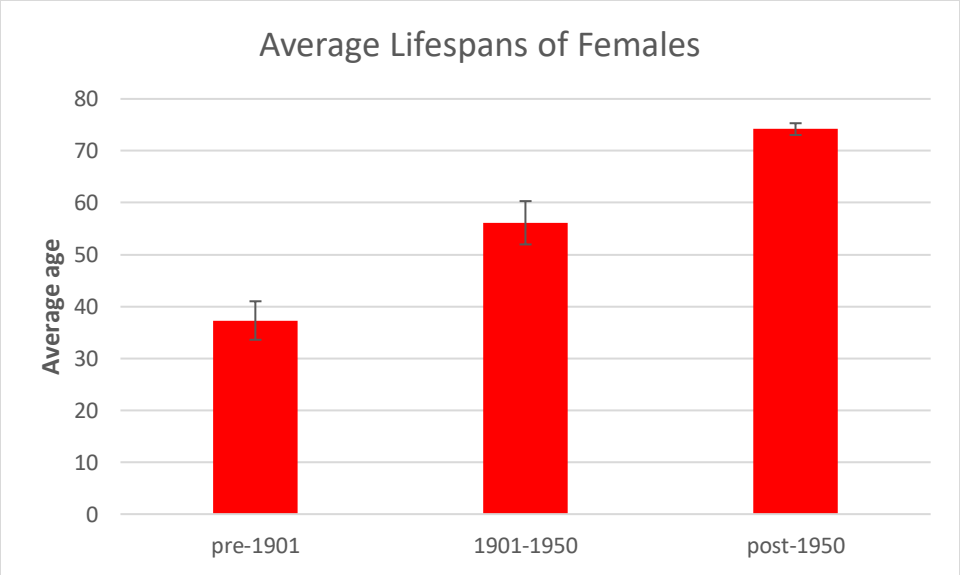

Figure 2. Bar graphs showing the average lifespans of females in the three different time periods. Also shown are the error bars. t=-7.196 p=<0.001.

Survivorship Curve: The survivorship curve here was comparing the males and females in all three time periods directly on one graph. Based on the age class at death, six different curves

could be made. The bottom two curves were comparing the pre- 1900 male and females. Both curves demonstrated a type 2 survival ship curve where the mortality rate was increasing at a constant rate as the age of the people increased (Fig 3). The middle two curves compared males and females between 1901 and 1950. Again, the curves were more like type 2 where mortality rates were increasing at a constant rate as the age of the people increased (Fig 3). Lastly, the top two curves represent the post 1950 male and females. These two curves shifted away from the last four ones where they became type 1 survivorship curves. Where the mortality rate is low until about the age of 60 and then the rate of mortality increases rate (Fig 3).

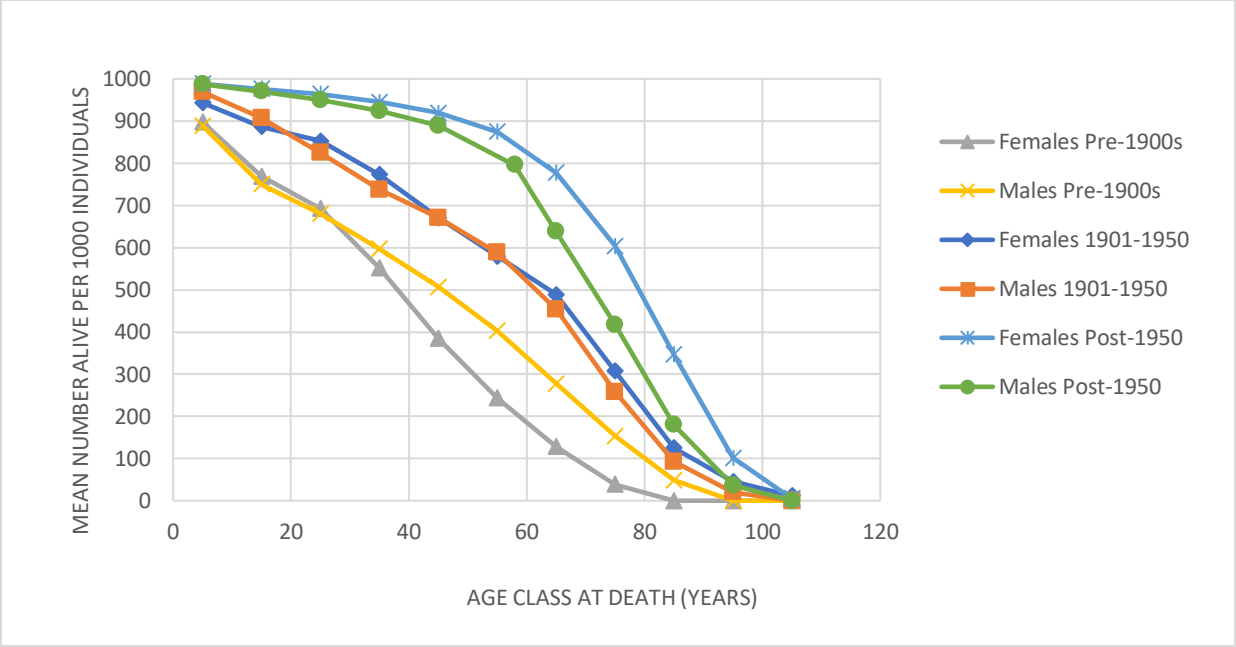

Figure 3. The survivorship curves comparing the mean number alive per 1000 people of male and females at the different ages at the different time periods.

Discussion

My hypothesis was that there will be a difference in the average life spans between male and females during the three different time periods. Shown in the results section, the average life span for males and females in all three of the different periods have all increased. This is most

likely because of the advancements in technology and advances in medicine. But in the time span of pre- 1900s and 1901- 1950, the average life span for the males is lower than the average life span of the females. This is most likely due to the multiple wars happening in this period. The civil war, World War 1 and World War 2 were the three wars that happened in these periods. The survivorship curves tell us how the type of curve has changed overtime due to many different factors. The different factors again include advances in technology and modern medicine. The survivorship curves of the people in the West View cemetery is probably like other cemeteries across the United States. The conditions in which one would see a type 1 survivorship curve would be low infant mortality and higher mortality as the organism gets older. For the type 2 survivorship curve would have a constant mortality rate. The data represented in these time periods paint an accurate picture of the mortality rates of the population at the time. In the late 1800s and the pre- 1950s, it was a hard time for Americans, there were world wars, a civil war, and a great depression. Some of the biases and assumptions that are present in the experiment are that we don't have the data of how each individual data point that we collected had the cause of death. So, we are assuming that many if the men died in war while the women were at home dying if old age and or disease. Some of the limitations that led to the assumptions would be the cause of death not on the head stones. Some things that I don't know after this experiment would be what was the number one cause of death in the pre- 1900s period. The way I could find that out would be to look up old records of the time and examine what was the most common cause of death.

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