International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Statistical Analysis of the Correlative Effects of Smoking, Alcohol Consumption, and Obesity on Predicted Lifespan

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Abstract

This research aims to quantify the accelerated aging due to lifestyle practises of smoking,alcohol consumption and obesity

Introduction

The escalating prevalence of deleterious lifestyle behaviours, including nicotine addiction, excessive alcohol consumption, and corpulence, constitutes a formidable challenge to global health. This investigation seeks to quantify the accelerated biological ageing precipitated by these factors. Through rigorous statistical analysis, we aim to elucidate the intricate relationship between these variables and human longevity. By discerning these correlations, we aspire to inform public health strategies designed to curtail the insidious impact of these behaviours and promote salutary lifestyle modifications.

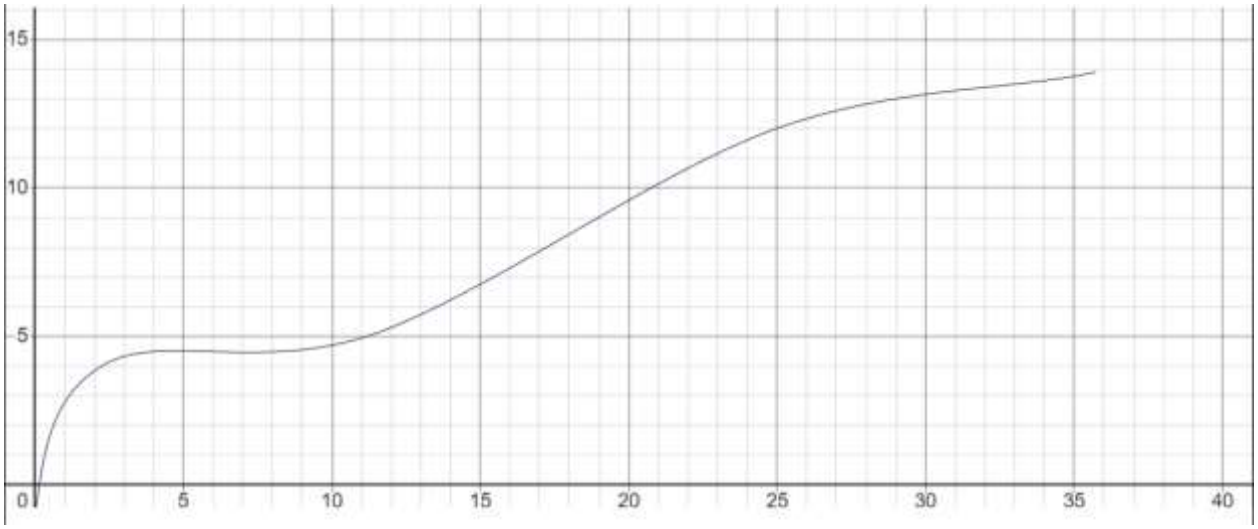
Research Methodology

We first began researching data based on the average 30-year-old Indian male we had taken as a control or normal for this experiment(1). we then predicted that this man would live to be approximately 70 years old with moderate exercise and a general diet. Then using past research and analysis we split our experiment into 3 parts each analysing a different variable and its effect on health and lifespan.

1) Cigarettes

We took 5 different consumption rates and estimated their modern-day effects on our test subject using past conducted research and statistical data provided by the WHO(2)(3)(4)(5) to see how each would affect the number of expected years a person has to live we then tabulated the results to eventually place them on a line graph and see where there were abnormal spikes in consumption to years lost.

Number of packs in lifetime	Number of 300 packs in lifetime	Number of years lost
0	0	0
365	1.2	4
3650	12.2	7
7665	25.6	13
10950	36.5	15

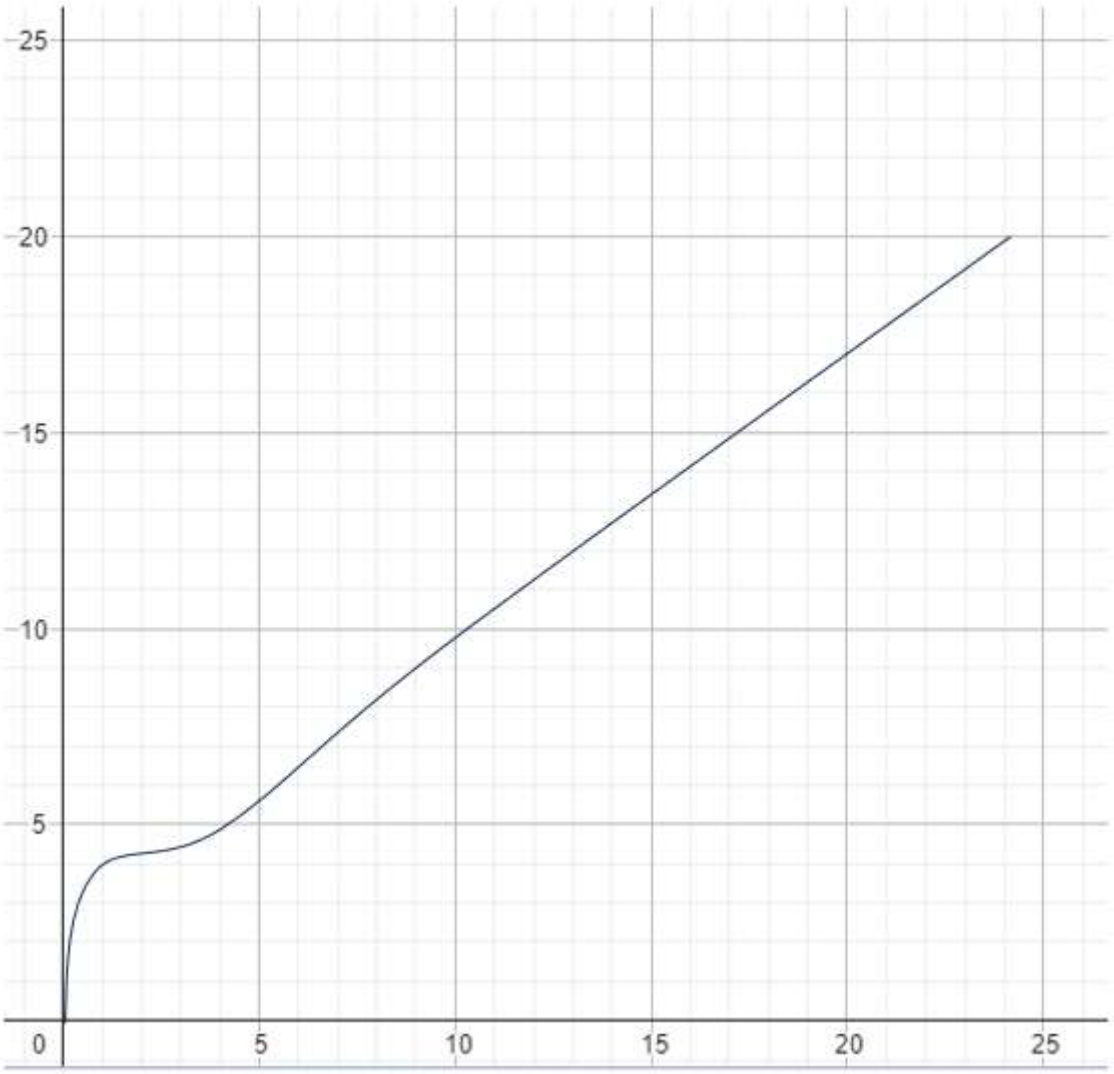


Scale: x-axis 1 unit = 300 cigarettes
Y-axis 1 unit = no. of years lost
By this, we were able to use past experience(7) and an educated question to modern times and the effect on lifespan an average smoker would smoke about 25 units on our graph and if they are simply able to reduce it to approximately 17 units it would help them live 6 years longer

2) Alcohol

Similarly, we took 5 reference points for alcohol after looking into past experiences(8)(9)(10)(11)(12)(13) we again tabulated and plotted our results in the above-mentioned manner.

Number of drinks in lifetime	Number of 300 drinks in lifetime	Number of years lost
0	0	0
432	1.4	4
1260	4.2	5
3120	10.4	10
7300	24.3	20

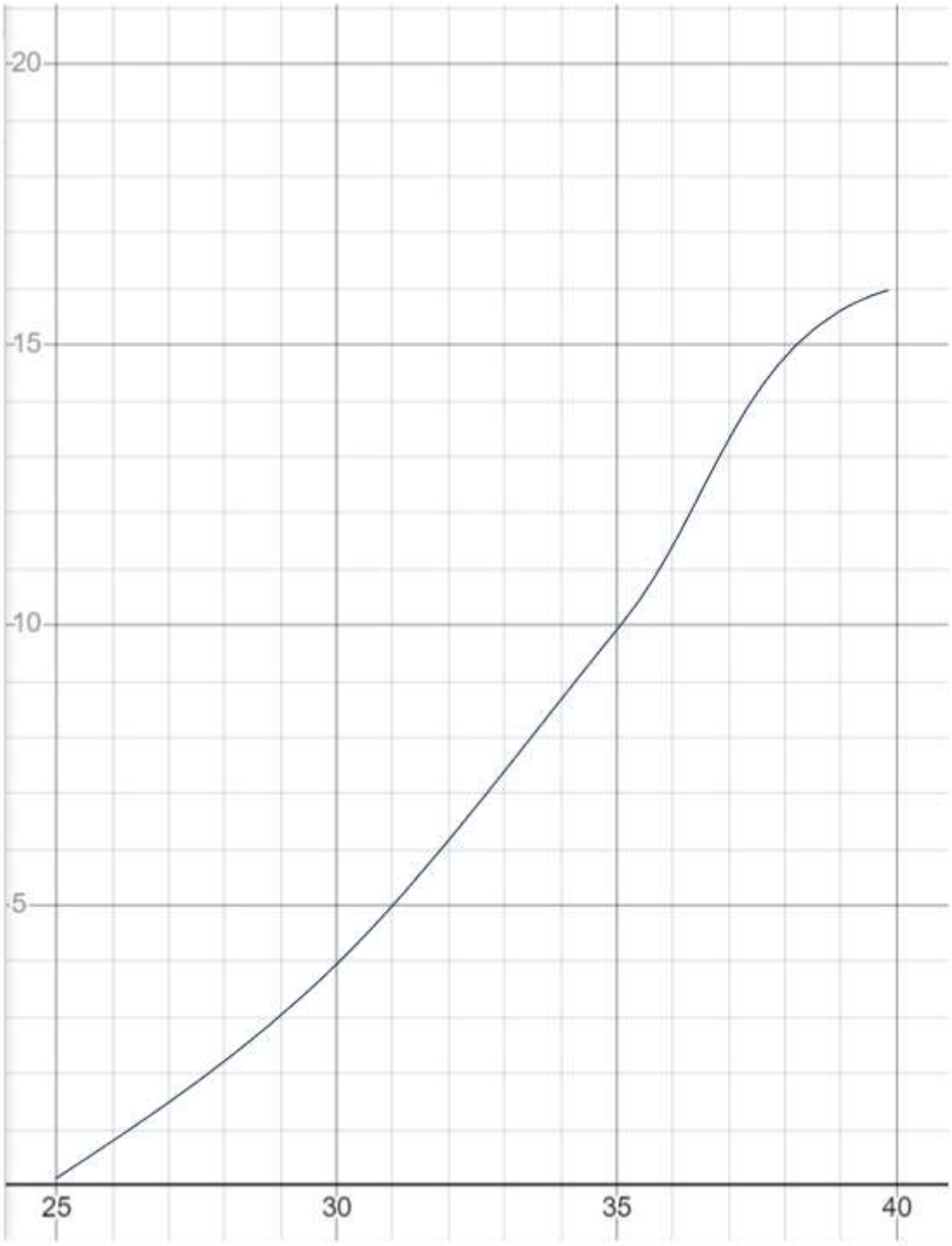


Scale: x-axis 1unit = 1 year lost
Y-axis 1unit = 300 drinks consumed
Sadly, most severe alcoholic cases would consume up to 24 units(14)(15) of our graph leading to a humongous loss of 20yrs but if they bring themselves down to 16 units they can enjoy 5 more years of life.

3) Obesity

Likewise, we took 4 reference points of obesity and utilized research previously done to draw results which we tabulated and graphed to eventually pull out a conclusion from.(16)(17)(18)(19)

Weight category	BMI	Number of years lost
Normal	25	0
Overweight	30	4
Obese	35	10
Very obese	40	16



Scale: x-axis 1 unit =1 BMI
: y-axis 1 unit= no. of years lost due to lifestyle
The mean BMI of the overweight community is 37(21) resulting in a 13-year drop in lifespan.
However, with a good diet and active fitness, they can reduce their BMI to 33 resulting in only 7 years lost which can easily be removed if the momentum of reduction of weight continues.

Rationale

The rationale for this method is since we are using interdisciplinary research experimental and applied re

search and do not have access to databases of subjects who have the above-mentioned symptoms we are using scientifically accredited sources and applying to inference-based knowledge that we have to eventually arrive at results.

Mathematical Working

We used an Artificially intelligent machine learning device to combine three factors, your BMI, smoking habits and alcohol consumption to create a prediction of the life expectancy of a person. This Machine was provided data from tables from the World Health Organisation, these tables provide statistical data on life expectancy based on age, gender and lifestyle choices. It has tested about 6,339,083 males that fit into the category of people that we want to test. By keeping age and gender constant the only variable, we change is lifestyle choices. We have particularly used these three factors in our research as regression analysis has shown a strong relationship between these three factors and life expectancy. We used various measures of central tendency and statistical results to plot the census, and samples of qualitative and quantitative data researched and deduced by us to represent our topic.

The estimator we just mentioned is the Maximum Likelihood Estimate (MLE).(22) For MLE you typically proceed in two steps:

We first sampled our data from life tables and actuarial tables, provided by the WHO and other credible sources. Secondly, we calculated the highest and lowest for our three variables to set parameters for the distribution of data to represent what we observed as most likely to occur.

We also inculcated various methods of analysis such as Correlation analysis, This method can be used to identify patterns of connection by measuring the direction and strength of associations between these variable(s) and longevity. In addition to highlighting which variable has the most influence, a regression analysis will build a model to account for this and offer you an estimate of how long each element is expected to enable life. Finally, survival analyses will investigate how these characteristics affect the chance of dying over time and offer hints about the process by which health decline proceeds. A comprehensive examination of the complex relationship between ageing and lifestyle can be facilitated by utilising a complementary combinatory method.

Conclusion

As shown above, we were able to quantify the negative effects and efficient solutions for the health implications we were observing. But we truly want to stress upon the vitality of change that is required. Although we have reduced these issues to mere numbers it is an injustice to the bigger problem that exists. We want to nudge the mathematical community towards social research compared to theoretical research also increasing practical applications increasing interest in mathematics and statistics. Analyzing vast datasets to research life expectancy predictions emphasizes the importance of big data collection in mathematical research. Thereby somewhat altering the future perspective of math research into two branches which could work in amalgamation to have more concrete research

Evaluation

This research is based solely on statistics and real-life data from credible Health organisations eg(3); hence it is not biased by opinions at all. However, our research is limited to a singular gender and only the age bracket of about 30 years, hence the readings may be inaccurate and unreliable for people of other ages

and genders. Furthermore, this research does not take into account several other factors like inherited diseases, ethnicity and environmental conditions.

For future research, broader perimeters could be taken to include people from all age groups and ethnicities and could also include probabilities to show the chances of developing other diseases due to these addictive habits. By completing this depth of research, governments could use it to introduce health policies to improve healthcare and safety and it could improve the accuracy of actuarial models used in various fields like, insurance and pensions.

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