

Global Impact on Human Obesity using Shrinkage Models Through Machine Learning Algorithms

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Abstract

Global human obesity is a serious concern and high-risk factor worldwide as per the declaration of the world health organization (WHO) and the global burden of diseases (GBD). Global obesity is expected to become the next global pandemic caused by unhealthy food, unaware and lack of education in the universe. World Health Organization (WHO) has estimated that these non-communicable diseases are now responsible for 60% of the world's annual mortality and human obesity is one of them. The several Sustainable Development Goals have been focused (like SDG 4) by United Nations emphasizes promoting and ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. These global factors should be immediately overcome that are directly or indirectly causes of global deaths. We have established six main global indexes and compared them with global human obesity. For this purpose, we have used the global social index, global economic index, global education index, global environmental index, global food & nutrition index, global health index and population density as independent variables to check the dependency on global human obesity. We have developed shrinkage models and predictions for better understanding using machine learning algorithms. The following statistical computing software's (STATA and R language) have been used to analyze the global data. The results significantly contribute to the current study with a reasonable RMSE and R square values by using ridge, lasso and elastic net regression models. Health and Food indexes positively impact human obesity and global education, global economic, global environment, global social and population density have a negative impact by using lasso regression models through machine learning training data. Several graphical representations have been shown in the main body of the manuscript for a better understanding of this study. Global education, global economic, global environment, global social, and population density negatively impact human obesity.

Health and Food indexes positively increase human obesity by using ridge regression models through machine learning training data. The study is concluded with 10-fold cross-validation by using trained data by taking 1, 0 and 0.5 values of alpha during the development of a gaussian family of models through lasso, ridge and elastic net, respectively. This study concludes that by increasing global education, more socializing will be caused to decrease obesity. Achieving strong healthcare systems, strong economic conditions, and clean air with stable environmental quality will decrease global human obesity.

Keywords: Human Obesity; Social index, Economic index, Education index, Environmental index, Food & Nutrition index, Health index; Population Density; Machine Learning