

A Study on Vaccination Concerns in Albania Analyzed by Machine Learning Classifiers

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Abstract

Background: Vaccination is one of the most successful public health interventions in the world. In our country immunization rates have shown regress in recent years from 94% in 2008-2009 to 75% in 2017-2018 according to Albania Demographic and Health Survey 2017-2018. This decline in immunization rates has led to Measles epidemics we have seen in the last decade. The “Vaccine hesitancy” phenomenon is becoming a concern in our country and is highly contributing to the decrease in the immunization rates.

Objectives: Our study intends to find out the reasons why parents Delay or Refuse vaccination of their children in the first 5 years of life. Another goal is to find similarities of concerns between parents who DO vaccinate their children and parents who Delay or Refuse vaccination.

Study design and methods: Anonymous confidential questionnaires were given to 1206 random parents in public and private health centers all over Albania. They expressed their concerns in regards of vaccines done to children 0-5 years old according to the Albanian Immunization calendar. Data was gathered and a detailed statistical analysis was done to find significant concerns parents have in both categories (1. Do vaccinate vs 2/3 Delay/Refuse vaccination). Further we used 2 Machine Learning Classification Algorithms: A. Decision Tree Classifier, B. Support Vector Machine.

Results: From the statistical analysis was concluded that 95.27 % of the parents have some type of safety concern, trust issue, side effects and source of vaccine supply concern. 10 % of all

parents and 57.7% of category 2/3 are concerned about Autism, 17% of them complain “Vaccines are not safe”, while 29% believe “There are too many vaccines given at the same time”. Another important new concern we found to be statistically significant is “I do not trust the effectiveness of State Vaccines“ (15.38 %), Chi-Square calculated $p\text{-value} = 4.42E-5$ (<0.05). Decision Tree Classifier and Support Vector Machine gave accuracy levels of 94.6% and 95.45% respectively.

Conclusions: This study proves there is significant evidence that parents’ concerns are real and we, as health care professionals, must address these concerns and take measures. We believe that if parents are convinced that state vaccines have good quality, parents will be more prone to vaccinate their children in time and ultimately decrease Measles and other infectious diseases outbreaks. It is important to invest in giving them more information about vaccines quality and safety.

Key words: Immunizations, Vaccines, Vaccine Hesitancy, Machine Learning