

## Chapter 15

# Framework for Prediction of Depression Among Adolescents Using Machine Learning: A Case of Zimbabwe

**Panashe Chiurunge**

*Graduate Business School, Chinhoyi University of Technology, Zimbabwe*

**Agripah Kandiero**

*Africa University, Zimbabwe*

### ABSTRACT

*Depression being a behavioural health disorder is a serious health concern in Zimbabwe and all over the world. If depression goes unaddressed, the consequences are detrimental and have an impact on the way one behaves as an individual and at the societal level. Despite the number of individuals who could benefit from treatment for behavioural health concerns, their difficulties are often unidentified and unaddressed through treatment. Technology carries the unrealised potential to identify people at risk of behavioural health conditions and to inform prevention and intervention strategies.*

### INTRODUCTION

The prediction of depression among adolescents has emerged as an exciting and consequential area of research and has gained much interest in developed and developing countries. This study reviews the background of the research relevant to the study. It also includes the statement of the problem, objectives, research hypothesis, and significance of the study, delimitations and limitations of the study, the definition of key terms and abbreviations and finally the summary of the chapter.

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## **Background to the Study**

Depression is a common illness worldwide, with more than 264 million people affected (Indu, Russel & Andare, 2019). Depression is different from usual mood fluctuations and short-lived emotional responses to challenges in everyday life. Especially when long-lasting and with moderate or severe intensity, depression may become a severe health condition. It can cause the affected person to suffer much and function poorly at work, at school and in the family. At its worst, depression can lead to suicide. Close to 800 000 people die due to suicide every year, meaning 2192 people per day, 92 people per hour. Suicide is the second leading cause of death in adolescents (Indu, Russel & Andare, 2019).

Although there are known, effective treatments for mental disorders, between 76% and 85% of people in low- and middle-income countries receive no treatment for their disorders (Indu, Russel & Andare, 2019). Barriers to effective care include a lack of resources, a lack of trained healthcare providers and social stigma associated with mental disorders. Another barrier to effective care is an inaccurate diagnosis. In countries of low-income levels, people who are depressed are often not correctly diagnosed, and others who do not have the disorder are too often misdiagnosed and prescribed antidepressants. Although adolescents are often considered a healthy population, they appear to be particularly vulnerable to depressive disorders. Prevalence rates in childhood are low with no gender differences and then increase significantly in adolescence, while gender differences emerge. Technology carries the unrealised potential to identify people at risk of behavioural health conditions and to inform prevention and intervention strategies.

Advances in technology, such as social media, smartphones, wearables and neuroimaging, have allowed mental health researchers and clinicians to collect a vast range of data at a rapidly growing rate. A robust technique that has emerged from analysing this data is machine learning, which aims to construct systems that can automatically improve through experience using advanced statistical and probabilistic techniques. Machine Learning has provided significant benefits to a range of fields, including artificial intelligence, computer vision, speech recognition, and natural language processing, allowing researchers and developers to extract vital information from data, provide personalised experiences, and develop intelligent systems. Within health fields such as bioinformatics, Machine Learning has led to significant advances by enabling speedy and scalable analysis of complex data. Such analytic techniques are also being explored with mental health data, with the broad potential of both improving patient outcomes and enhancing understanding of psychological conditions and their management in the broader community.

## **Research Problem**

Failure to use machine learning to detect depression in time and prevent adolescent suicides in Zimbabwe.

## **The Objectives of This Study Are To**

1. Investigate the likelihood of depression in adolescents using Machine Learning using Zimbabwe as case study.
2. Develop a forecasting procedure that can be used to identify depression using Zimbabwe as case study.
3. Formulate the developmental trajectories of depression that can lead to suicide using Zimbabwe as case study.

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