

# Predicting Depression based on Health-Related Quality of Life (HRQoL)

<sup>1st</sup> Mr. Rahul Pathak

School of Science  
MIT World Peace University  
Pune India

Ms. Akshada Tonape

School of Science  
MIT World Peace University  
Pune, India

**Abstract—** Depression is not only one of the most prevalent of the major psychiatric disorders but also one of the most researched mental illnesses. Previous research has primarily relied on depression detection based on various body and facial expressions, speech prodigy, MRI features and online communities keeping the association limited to external factors. Additionally, very few have contributed in the area of cure for depression. Treating depression effectively means not just keeping it to taking medications and doing therapy. The more changes in lifestyle ensuring a healthy mind and body, the more you'll be able to cope with the challenges of depression. Therefore, this survey study focuses on the relationship of food and lifestyle on the depression level of a person. Various health related lifestyle habits with respect to the corresponding HRQOL score can help in finding patterns of habits leading to different depression levels where the depression can be calculated using corresponding questionnaire. This will help in analysing the types of habits to be encouraged contributing to the cure for depression.

**Keywords—** Depression, Mental Health, Machine Learning, Prediction.

## I. INTRODUCTION

Depression is one of the major risk factors for causing suicide in adolescents, the higher leading cause of death in the specific age group, [4] where more than half suicide victims reported to have a depressive disorder during the time of their death. Depression additionally causes serious social, educational and personal impairments [5], and an increased rate of substance misuse, obesity, smoking and various addictions [8][9]. Thus, to recognize the disorder and treatment is important.

The World Health Organization (WHO) reported the noncommunicable diseases caused by unhealthy lifestyles. Various studies have associated between mental health problems in adolescents, eating behaviors, nutrient intake patterns and health related quality of life [2]. Breakfast skipping, high sugar consumptions with soft drinks and sweets were associated with various mental health

problems. [10], [11] Lifestyle habits such as Sleep Cycle, Breakfast, addictions highly contribute to a person's depression [3]. In the study [1] improvising the diet quality and healthy diets resulted in improvement in mental health of adolescents. A diet with plant foods, fish, regular meals were with better mental health, while nutrient-poor diets and irregular meals resulted into poorer mental health [12], [13].

Considering the association between (HRQoL) and depression and to address the urgent health issue our aim is to predict depression scores based on factors affecting the quality of life in order to analyse the categories of problems to work on in order to have a balanced health.

## II. LITERATURE SURVEY

Depression is one of the leading cause of disability in people worldwide. Treating and diagnosis of depression have been varied since ages and yet is not up to finding specific solutions for the same. Detection of Depression has been varying and can be a huge step to address the mental illness and offer support to the people suffering from this terrible mental illness.

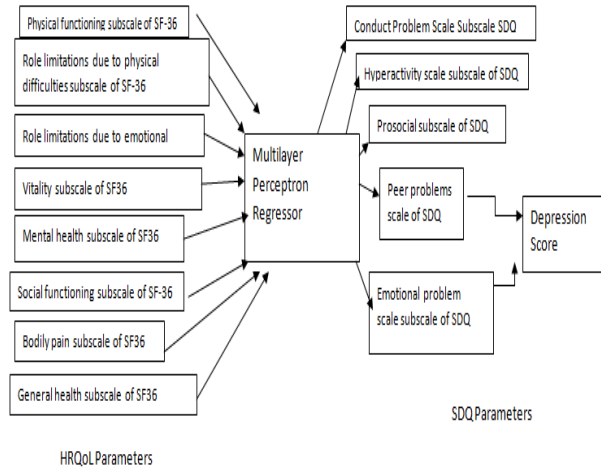
Several papers presented a study where depression detection was associated with body movements and expressions. [6] Association of depression detection with facial expressions, vocal utterances and prodigy and speech signal processing. A study additionally focused on sensed data collection to provide diagnosis and detection. Detection being highly based on data collection and availability social media platforms being an integral part of people's life are used by researchers to identify the causes of depression and detect it. Many studies propose a text mining approach of using twitter data to detect depression [7]. Detection of depression being a wide area of research focuses on using machine learning methods to predict depression focuses on prediction of suitable treatment. Further in [16], [17] systems for helping provide a solution to depressive patients were developed. Having a few contribution in providing good prediction results for depression our study focuses on achieving good predictions.

In [2] depression was proved to be associated with nutrition intake, lifestyle habits, behavioural habits [3] where [1] focused on dietary intake patterns being associated with depression. The study [5] focuses on risk factors of depression in adolescence and clinical implications and impairments which results into high suicidal rates in this age group [4]. Various health and diet [8], [11], [10] provides a high contribution of depression rates. Considering the depression

rates in adolescence and association of lifestyle habits to it our study provides a prediction for depression scores based on HRQoL quotients

### III. PROPOSED SYSTEM

#### A. Architecture



#### B. Design Considerations.

##### • Data Collection and Data Preprocessing:

Dataset from [2] was used for the survey where data attributes PFSF36, RPSF36, RESF36, VTSF36, MHSF36, SFSF36, BPSF36, GHSF36, EPSSDQ, CPSSDQ, HASSDQ, PPSSDQ, PSSSDQ were extracted and used from original dataset. All the null values were replaced with mean .SF36 was used to determine Health related quality of life .The questionnaire consists of 36 questions scaling eight dimensions of life's quality: Physical Functioning (PF); Role Physical (RP),Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE). Further, Strengths and Difficulties Questionnaires(SDQ) was used for the prediction of mental health issues. SDQ is a screening questionnaire for psychological problems of adolescents. The questionnaire includes 25 questions each of the which is scored on a three pointer type scale with range from 0 to 2. The questions are grouped into a five subscales with 5 questions delivering scores for emotional disorder, hyperactive behavior, peer relationship, pro-social behaviors.

##### • Machine Learning

We used Multi-layer Perceptron regressor for multiple input and multiple output prediction. Features of dataset[2] PFSF36,RPSF36,RESF36,VTSF36,MHSF36,SFSF36,BPSF36,GHSF36 were given to the model to predict EPSSDQ,CPSSDQ,HASSDQ,PPSSDQ,PSSSDQ scores. Emotional disorders and peer relationships contribute to internalizing problems and can be further used to predict depression scores. Accuracy was calculated using score function.

Table of features.

PFSF36	Physical functioning subscale
RPSF36	physical difficulties subscale
RESF36	emotional difficulties subscale
VTSF36	Vitality subscale
MHSF36	mental health subscale
SFSF36	Social functioning subscale
BPSF36	Bodily pain subscale
GHSF36	General health subscale
EPSSDQ	Emotional problem scale
CPSSDQ	Conduct Problem Scale Subscale
HASSDQ	Hyperactivity scale subscale
PPSSDQ	Peer problems scale
PSSSDQ	Prosocial subscale

### RESULTS/LIMITATIONS.

We came up with a novel approach where SDQ scores were predicted for sub parameters based on given HRQoL parameter subscales.Further there are few limitations in our research as the size of the dataset was limited which reduces the accuracy of our prediction. The study focuses on adolescence health stages. The depression score needs to be calculated using two attributes of SDQ scale further.

### CONCLUSION/FUTURE WORK

Considering Association between health-related quality of life to mental illness, our study provides a prediction for adolescence using neural network. The predication will provide an insight of the quality of lifestyle of adolescence affecting mental health and further inferring on selective and preventive measures to be followed to avoid depression. Our study can further be extended by providing better lifestyle recommendations based on the depression scores.

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