

# Factors Influencing the Suicidal Ideation among Adolescents in Theni District

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**Abstract**— Suicidal behaviors is one of the major health concern in teenage and increase dramatically during adolescence. In order to effectively intervene and ultimately prevent suicide in youth, the field needs to be able to identify and predict adolescents from suicidal risk. Adolescent years are a notoriously challenging time, as children go through the biggest changes since their first year of life. In this paper, a data mining case study is conducted in Theni district, Tamilnadu, India to determine the factors influencing the suicidal ideation among adolescents. It analyzes the factors for suicidal ideation among adolescents using data mining technique. Data were collected from the public using a set of questioner and it is analyzed using R tool. Finally, a decision tree is constructed from the study and presented the factors that have great impact on teenagers.

**Keywords**— Suicidal Ideation; Suicide Attempt; Adolescents; Theni District; Data Mining; Classification; Decision tree.

## I. INTRODUCTION

India is forecasted to be the youngest country in the world by 2020. It has 1.2 billion people under the age of 26. Half of Indian population is to be youngest with a median age of 29 years. On the other hand, the Lancet report 2012 stated that India has one of the world's highest suicide rates for adults aged from 15 to 29 which have great impact on the economic growth. It is shocking to know that every hour one student commits suicide in this country [1]. According to National Crime Records Bureau (NCRB) and as reported in the Indian police records, the student suicides in 2015 stood at 8934 [2]. Tamil Nadu and Maharashtra are listed on the top of having high rate of suicides among youth. Though there are many reasons for the suicidal tendency among youth, young adults find it difficult to cope with failure in examinations and careers. Moreover, the families and other social institutions fail to offer adequate support or solace to this kind of youth. India suffers 87 % shortage of mental-health professionals and public spending on mental health is also very low. Thus, this research focuses to analyze the Suicidal behaviors and the factors influencing the suicidal ideation among adolescents in Theni district, Tamilnadu, India. They used data mining techniques and statistical analysis to identify the factors of greater influences and presented some mechanism to be followed to save the younger Indian generations. This paper is organized as follows. Section II presents the background of the study. The review of related study is elaborated in section III. IV. Section IV is significance of the study and section v depicts the statement of the problem. Section VI is objective of the study, section VII limitation of the study, section VIII is methodology, section IX experimental analysis, section X findings and interpretations and section XI conclusion.

## II. BACKGROUND OF THE STUDY

The youths are the trustees of a nation. Youth force is dynamic in nature and orientations are acquired in this age. Youth is the massive reservoir of energy which needs to be tapped and coupled intelligently for the development of the society. At present, India has the largest share of youth inhabitants in the world and this will continue for the next 20 years. This is the major driving force of economy of the country. The growth in the Indian population and the projections in population by the World Bank is depicted in Fig. 1.

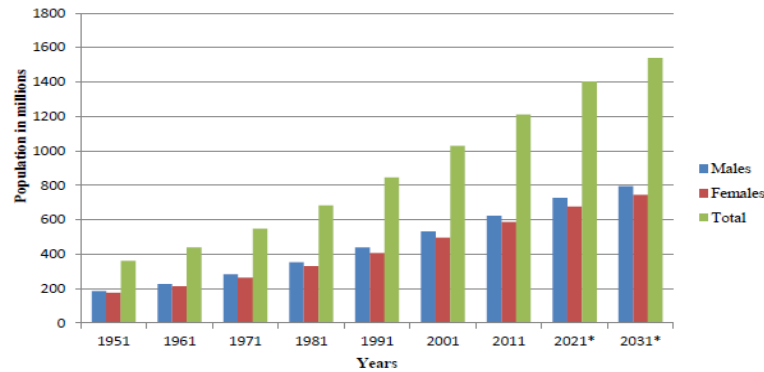


Fig. 1. Growth of Indian Population and Population Projections

Source: Office of the Registrar General, India [3]

\* Population projections by World Bank

According to the National Crime Records Bureau, every year more than 1,00,000 people commit suicide in India [4]. There are many reasons for committing suicides such as family problems, professional problems, financial distress, illness etc. The second common cause for the death of the adolescents is suicide. Youth among the age group of 18 - 30 is one of the vulnerable groups with a total share of 33 % suicides [5]. The causes and incidents recorded in Indian police records in the year 2015 are tabulated below in Table 1.

TABLE I  
Incidences of Suicides in 2015

S.No.	Cause	Male	Female	Total
1.	Marriage Related Issues	2497	3915	6412
2.	Bankruptcy or Indebtedness	4081	276	4357
3.	Failure in Examination	1511	1135	2646
4.	Impotency / Infertility	243	205	448
5.	Other Family Problems	24043	12885	36928
6.	Illness	14232	6944	21176
7.	Death of dear person	596	355	951
8.	Drug Abuse / Addiction	3513	157	3670
9.	Fall in Social Reputation	804	289	1093
10.	Ideological Causes / Hero Worshipping	40	17	57
11.	Love Affairs	2541	1935	4476
12.	Poverty	1454	245	1699
13.	Unemployment	2450	273	2723
14.	Property dispute	1895	596	2491
15.	Suspected / Illicit Relation	278	195	473
16.	Illegitimate Pregnancy	0	49	49
17.	Physical Abuse (Rape, etc.)	15	65	80
18.	Professional / Career Problems	1317	272	1589
19.	Causes not known	11140	5073	16213
20.	Other Causes	18878	7207	26085
	<b>Total</b>	<b>91528</b>	<b>42088</b>	<b>133623</b>

Source: National Crime Records Bureau, Ministry of Home Affairs

### III. REVIEW OF THE RELATED STUDY

Shira Barzilay et al., examined the risk and protective factors controlling the associations between bullying victimization such as verbal, physical and relational bullying with suicide ideation / attempts among European adolescents [6]. Cross-sectional data of 11,110 students from ten European Union countries were analysed in the study for saving and Empowering Young Lives in Europe. Victimization of depression, anxiety, parental and peer support and suicide ideation and attempts were

used to measure the study. Hierarchical nonlinear models controlling for socio-demographics was applied in the outcome of the study. Even though the boys were more victimized to verbal and relational prevalence but girls were more likely to relational victimization. The study revealed that suicide ideation among adolescents was associated with depression who perceived low parental support.

Nicole Steck et al., examined the socio-demographic factors of suicide in Swiss adolescents [7]. The research was analyzed the time trends in youth suicide in the Swiss National Cohort (SNC). Suicidal tendencies among adolescents of age 10 to 18 years were considered for research from the year 1991 to 2013. Within the research period, a total of 592 suicides were recorded in Europe among 2.396 million adolescents were reviewed. The factors for a higher rate of suicide such as single boy, living in rural regions, being an only or middle-born child and living in a single parent household were analyzed. The research revealed that the familial and socioeconomic factors such as birth order, type of household and urbanity were some of the common reason for suicide among youth suicide in Switzerland and recommended to consider these factors while designing prevention programmes for youth suicide in Swiss.

Rajesh kumar et al., analyzed the suicidal tendency among Indian adolescences [8]. Suicidal intention had great impact on family, relatives, friends and in the society where they were living. Age, sex, premorbid personality, biological, psychiatric problems, social and environmental factors also play a major role in influencing suicidal intension. The authors believed timely risk assessments to prevent the social incidents among youth. School teachers and health personnel could be trained for giving awareness to the young minds to change the mortality and morbidity of suicide.

Arve Strandheim et al., examined the associations between health and lifestyle factors recorded in the participants' early teens and development of suicidal thoughts recorded for the last 4 years [9]. Almost 2399 secondary school students were participated in the Young-HUNT study. Behaviour and health traits were the exposure variables of the research which lead to suicidal thoughts in young minds of Indian youth. Suicidal thoughts were prevalent among 14.2 % of boys and 19.5 % of girls and were associated with anxiety or depression, conduct problems, pain or tension and overweight in early adolescence life. The proposed research expressed that girls were predominated in young adults who were experienced suicidal thoughts.

Yeojin Im et al., conducted a study to identify the risk factors for suicide ideation among adolescents [10]. The Risk Behavior Survey was conducted among 5th–9th Korean Youth using data collected over five years. Al most 370,568 students were responded the questionnaire about suicidality. Students' demographic characteristics, such as gender, low economic status, low grades and not living with one or both parents were considered in the study. Mental and Behavioral health risk factors like smoking, depression, high stress, low sleep satisfaction, alcohol consumption and sexual activity were affecting suicide ideation. The study advised the Healthcare providers to target adolescents manifesting the aforementioned risk factors while developing suicide prevention programs for them.

#### IV. SIGNIFICANCE OF THE STUDY

This study has been conducted in Theni district by collecting and analyzing cases of suicides intensions among teenagers and young adults. It tries to identify the major causes for suicides among teens and young adults of Theni district and to suggest methods to curb it. The combined stressors of academic demands social interaction problems and career choices evidently make it impossible for some students to continue making the adjustments that their life situations demand. Compared to teenagers, adults are good at handling stressors' such as pressure from family and friends, work pressure and other stresses. However, under certain conditions, even they cannot handle some stresses and issues and tend to snap. If proper solutions to their problems are not found as soon as possible, they might end up taking the extreme step of committing suicide.

#### V. STATEMENT OF THE PROBLEM

The most frequently discussed personality traits associated with suicide are impulsivity, aggression, pessimism and negative affectivity. Though these specific factors will lead a person to suicide in many situations, suicide is often associated with negative events of various sorts. These events may lead the adults either to loss the sense of meaning in life or to lose hope on the future and create a mental state that the suicide is the only possible way out. According to research, Suicide is the end product of a long sequence of events that begins in childhood. People who commit suicide often come from backgrounds in which there was some combination of a good deal of family psychopathology, child maltreatment and family instability. This leads to low self-esteem, hopelessness and poor problem solving skills. Thus, the cause for the indentation of suicidal habit among adults and the solutions for them have to be identified clearly. This research focuses on identifying the factors that influencing the suicidal ideation among adolescents in Theni district.

#### VI. OBJECTIVE OF THE STUDY

The main objective of this study is to identify main causes of suicide among teenagers and young adults of Theni district. This study focuses on the major factors of suicide as well as provides suggestions to avoid the rising rate of suicide among adults.

## VII. LIMITATIONS OF THE STUDY

The limitations of the proposed study were listed below.

- ❖ The study was limited to adults and teenagers of Theni district, Tamilnadu.
- ❖ The study was conducted among 2500 respondents drawn as a sample from Theni district.
- ❖ The study was limited to cover all the reasons which leads to commit suicide.
- ❖ The study was only limited to list the outcomes of suicidal ideation among adolescents
- ❖ The study covered only the personal, family and societal factors.

## VIII. METHODOLOGY

The present study is an exploratory research conducted among the people in Theni. In order to pursue the aim and objectives outlined in the above section, a content analysis of information gained from the research process was conducted to establish the underlying trends in location to find common diseases.

The first stage is involved in gathering the secondary information from people. The second stage is identifying the age group among them and structuring a comparative analysis of the five identified parameters under each category. A Summary of interpretations is presented below. In the third stage, an analysis was carried out by making specific assumptions in a hypothetical situation. In the last and the final stage, on the basis of the results and interpretations, specific postulates were framed on each postulate hypotheses and tested through quantitative research using data mining algorithm. The above mentioned stages have been described as objectives in the preceding paragraph.

- ❖ **Data Mining Technique:** Data mining is the core process of knowledge discovery in databases. It is the process of extraction of useful patterns from the large database. To analysis the large amount of collected information, the area of Knowledge Discovery in Database (KDD) provides techniques to extract interesting patterns in a reasonable amount of time [11]. Data mining is the application of efficient algorithms to detect the desired patterns contained within the given data. It is the extraction of hidden descriptive of predictive information from large databases.
- ❖ **Decision Tree Algorithm:** Decision tree is the main algorithm used for classification and prediction. It is a typical inductive algorithm based on instance, which focuses on classification rules, displays decision trees inferred from a group of disorder and irregular instance. In the top-down recursive way, it compares attributes between internal nodes of decision tree, judges the downward branches according to the different attribute of the node, draws a conclusion from and draws a conclusion from leaf nodes in the decision tree. The entire tree corresponds to a group of disjunctive expression rules [12]. The proposed research considers the decision tree as a Boolean function. The input of the function is the object or all property of situation and the output is the “yes” or “no” decision value. In the decision tree, each tree node corresponds to a property test, each leaf node corresponds to a Boolean value and each branch represents one of the possible values of testing algorithm.
- ❖ **Construction and Pruning of Decision Tree:** Decision tree classification algorithm is usually divided into two steps: constructing Decision Trees and pruning Decision Trees.
  - *Construction of Decision Tree:* The Input of decision tree construction algorithm is a set of classic labeled examples. The result of structure is a binary tree or ternary tree. The internal nodes of a binary tree are usually represented as a logical judgment in the form of logical judgment. The internal node of ternary tree is an attribute of which edges are all values where there are several attribute values, several sides, tree leaf nodes are category tag. Method of constructing decision tree is a top-down recursive structure.
  - *Pruning of Decision Tree:* The object of Data mining is real world data, which are generally not perfect. Even though there are some missing values in attribute field, there is lack of essential data resulting to incomplete data or data are inaccurate even wrongly. Or containing noise, so it is necessary to discuss the problem of noise.

The basic decision tree construction algorithm does not consider the noise, so the generated decision tree fits completely with training examples, which will lead to excessive fitting and will destruct predictive performance. Pruning is a technique to overcome the noise but at the same time, it also can make the tree simplified and easy to understand.

Two basic pruning strategies are:

- Forward-pruning: It is pruning before the completion of the decision tree’s growth process. It is decided to continue dividing the impure training subsets or shutdown.
- Post-pruning: It is pruning after the completion of decision tree growth process. It is a fitting-and-simplifying of the two stage method.

- Information gain: Information gain is based on entropy of information to reduce the weight of desired information or entropy, sample classification according to determine to choose what kind of variables on what level.

Let  $S_i$  be the sample of  $S$ , who have the values  $A_j$  in  $A$ .

Let  $S_{ij}$  be a sample number of class  $C_i$  of subset  $S_j$ . The entropy of subset divided by  $A$  is given by:

$$E(A) = -S_{i1} + S_{i2} + \dots + S_{im} \text{ I/S } (S_{i1}, S_{i2}, \dots, S_{im}) \quad \dots (1)$$

The decision tree algorithm is given below.

**Algorithm Decision Tree Generation()**

**Input:** Data Partition  $D$ , Attribute \_list, Attribute selection\_ method

**Process:** A procedure to determine the splitting criterion that “best” partitions the data tuples into individual classes. This criterion consists of a splitting attribute and possibly, either a split point or splitting subset

**Output:** A decision tree for the study

- Step 1:** Create a node  $N$ ;
- Step 2:** If tuples in  $D$  are all of the same class,  $C$  then  
Return  $N$  as a leaf node labeled with the class  $C$ ;
- Step 3:** If attribute list is empty then  
Return  $N$  as a leaf node labeled with the majority class in  $D$ :// suicide\_intension
- Step 4:** Apply attribute selection\_ method ( $D$ ,attribute \_list) to find the “best” splitting criterion;
- Step 5:** Label node  $N$  with splitting criterion;
- Step 6:** If splitting attribute is discrete-valued an multiday  
splits allowed then//not restricted to binary trees  
Attribute list<-attribute\_list\_splitting\_ attribute;
- Step 7:** For each outcome  $j$  of splitting criterion  
Let  $D_j$  be a the set of data tuples in  $D$  satisfying the outcomes  $j$ ://a partition
- Step 8:** If  $D_j$  is empty then  
Attach a leaf labeled with the majority class in  $D$  to node  $N$ ;  
Else attach the node returned by generate\_decision\_tree( $D_j$ ,attribute list) to node  $N$ ;
- Step 9:** Return  $N$ ;

IX. EXPERIMENTAL ANALYSIS

The sample collected from the sample space is given in Fig. 2.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Name	Gender	Age	Qualification		1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	B. Abinaya	Female	19	BA[Eng]		1	0	0	1	0	1	1	1	1	1	0	0	0	1
3	N Aparna Devi	Female	18	BA[Eng]		1	0	1	0	1	0	1	0	1	1	0	0	1	1
4	S. Gowsalya	Female	18	BA[Eng]		1	1	0	1	0	1	1	0	1	0	0	1	1	0
5	P. Roohini	Female	19	B.Sc		0	1	0	1	1	1	1	0	1	1	1	0	1	1
6	V. Vannathi	Female	19	B.Sc		1	1	0	1	0	1	1	0	0	1	0	1	1	0
7	M. VeeraKarthika	Female	18	B.com		1	0	0	1	1	0	1	1	1	1	1	1	1	1
8	K. Pandi	Male	18	B.E		1	1	1	1	0	1	1	0	1	1	1	0	1	1
9	N. Vidhya	Female	19	BA[Eng]		1	1	1	1	0	1	0	0	1	1	1	1	0	1
10	E. Nanthini	Female	22	Msc(mat)		1	1	0	1	1	1	1	1	1	1	0	1	1	0
11	T. Dhivya	Female	19	BBA		1	0	1	0	1	1	0	1	1	1	0	0	0	1
12	S. Kumar	Male	19	BE		1	1	1	1	0	1	1	1	1	1	0	1	0	1
13	T. Priyatharshini	Female	20	B.Sc[cs]		1	0	0	1	0	1	0	1	1	1	1	1	0	1
14	S. Mani	Male	23	DEEE		1	1	0	1	1	1	1	1	0	1	0	0	1	1
15	R. Muthu lakshmi	Female	29	Msc		1	0	1	0	0	1	1	0	1	0	0	1	1	1
16	M. Paramala Devi	Female	29	BA		1	0	1	0	0	1	1	0	1	1	1	0	0	1
17	G. Mariyammal	Female	25	ME		1	0	0	1	0	1	1	0	1	1	1	0	0	1
18	P. Sargunam	Female	30	MA		1	1	0	1	1	0	0	0	0	0	0	0	1	0
19	R. Aarthi	Female	19	BA		0	1	0	1	1	1	1	0	1	1	1	0	1	1
20	B. Jeyanthi	Female	18	B.Sc		1	0	1	0	1	1	1	0	1	0	1	1	1	0
21	M. Jeeva Ranjani	Female	17	BBA		1	1	0	1	0	1	1	1	1	0	1	1	0	1
22	P. Akila	Female	17	B.Sc		1	0	1	1	1	1	1	1	1	0	0	0	1	1
23	C. Raja	Male	33	BBA		1	0	0	1	1	1	1	1	1	0	1	0	1	1
24	T. Indira	Female	17	BE		1	1	1	0	0	1	0	1	1	0	0	1	1	1

Fig. 2. Sample Data

A. *Data sources and Execution of research study*

- *Target population:* This survey covers all the villagers of Theni district.
- *Instrument design:* This questionnaire collects data on the attitude of the people regarding impact of television serials on rural women and adults. The items and reasons on the questionnaire have remained unchanged for several years.
- *Sampling:* This survey is a census with a cross-sectional design. Data are collected for particular units of the target population, therefore sampling is done.
- *Data sources:* Data are collected directly from survey respondents. Data are compiled from the responses of the researcher that are collected by the questionnaire. The researcher performs the data capture activities and follow-up of non-respondents. Contact with respondents is maintained for subsequent follow-up.
- *Error detection:* There are edits built into the data capture application to check the entered data for unusual values as well as to check for logical inconsistencies. Whenever an edit fails, the interviewer is prompted to correct the information. For most edit failures the interviewer has the ability to override the edit failure if necessary.
- *Imputation:* A 100% response rate is attained; therefore imputation is not necessary.
- *Quality evaluation:* Prior to the data release, combined survey results are analyzed for comparability; in general, this includes a detailed review of individual responses, general economic conditions, and historical trends. The data is examined at a macro level to ensure that the long-term trends make sense when compared to publicly available information in media reports, and etc.
- *Revisions and seasonal adjustment:* Revisions in the raw data are required to correct known non-sampling errors. They normally include replacing imputed data with reported data, corrections to previously reported data, and estimates for new births that were not known at the time of the original estimates. Raw data are revised on monthly basis. The purpose is to correct any significant problems that have been applied for an extended period. The actual period of revision depends on the nature of the problem identified.

B. *Analysis of data*

The process of the analysis of the research data is presented in this section.

**Data Input:**

To process the data, the following libraries for R workspace, arules, arules Viz, from cloud storage were installed. Then the dataset was inserted into the R-tool for processing.

```
>Data2[is.na(Data2)]<-which(is.na(Data2), arr.ind=TRUE)[,2]
> summary(Data2)
```

```
summary(fit)
```

Call:

```
rpart(formula = Qualification ~ Age, data = Data2_train, method = "class") n= 100
```

	CP	nsplit	rel error	xerror	xstd
1	0.07228916	0	1.0000000	1.036145	0.04180567
2	0.06024096	1	0.9277108	1.012048	0.04416940
3	0.01204819	3	0.8072289	0.939759	0.04990919
4	0.01000000	4	0.7951807	0.939759	0.04990919

**Building Decision tree:**

```
> trctrl <- trainControl(method = "repeatedcv", number = 10, repeats = 3)
> set.seed(3333)
> fit <- rpart(Age~Gender, data=Data2_train, method= "class")
> plot(fit)
> prp(fit, box.palette = "Reds", tweak = 1.2)
> tree <- rpart(Qualification ~ Age, data=Data2_train)
> rpart.plot(tree, type=4, extra=0, branch.lty=3, box.palette="RdYlGn")
```



Variable importance

Age  
100

**Node number 1:** 100 observations, complexity param=0.07228916 predicted class=BA expected loss=0.83 P(node) =1

**class counts:** 0 2 2 1 14 2 17 2 15 3 4 4 7 1 3 4 4 13 2  
**probabilities:** 0.000 0.020 0.020 0.010 0.140 0.020 0.170 0.020 0.150 0.030 0.040 0.040 0.070 0.010 0.030 0.040  
0.040 0.130 0.020

left son=2 (18 obs) right son=3 (82 obs)

**Primary splits:**

Age < 18.5 to the left, improve=3.100054, (0 missing)

**Node number 2:** 18 observations predicted class=B.Sc expected loss=0.6666667 P(node) =0.18

**class counts:** 0 1 2 1 6 0 0 0 6 1 0 0 0 0 0 1 0 0  
**probabilities:** 0.000 0.056 0.111 0.056 0.333 0.000 0.000 0.000 0.333 0.056 0.000 0.000 0.000 0.000 0.000 0.000 0.056  
0.000 0.000

**Node number 3:** 82 observations, complexity param=0.06024096 predicted class=BA expected loss=0.7926829

P(node) =0.82  
**class counts:** 0 1 0 0 8 2 17 2 9 2 4 4 7 1 3 4 3 13 2  
**probabilities:** 0.000 0.012 0.000 0.000 0.098 0.024 0.207 0.024 0.110 0.024 0.049 0.049 0.085 0.012 0.037 0.049  
0.037 0.159 0.024

left son=6 (21 obs) right son=7 (61 obs)

**Primary splits:**

Age < 19.5 to the left, improve=2.27966, (0 missing)

**Node number 6:** 21 observations predicted class=BA expected loss=0.6190476 P(node) =0.21

**class counts:** 0 0 0 0 4 0 8 2 3 0 1 2 1 0 0 0 0 0  
**probabilities:** 0.000 0.000 0.000 0.000 0.190 0.000 0.381 0.095 0.143 0.000 0.048 0.095 0.048 0.000 0.000 0.000  
0.000 0.000 0.000

**Node number 7:** 61 observations, complexity param=0.06024096 predicted class=MSc expected loss=0.7868852

P(node) =0.61  
**class counts:** 0 1 0 0 4 2 9 0 6 2 3 2 6 1 3 4 3 13 2  
**probabilities:** 0.000 0.016 0.000 0.000 0.066 0.033 0.148 0.000 0.098 0.033 0.049 0.033 0.098 0.016 0.049  
0.066 0.049 0.213 0.033

left son=14 (23 obs) right son=15 (38 obs)

**Primary splits:**

Age < 23.5 to the right, improve=3.104325, (0 missing)

**Node number 14:** 23 observations, complexity param=0.01204819 predicted class=BA expected loss=0.7391304

P(node) =0.23  
**class counts:** 0 1 0 0 0 0 6 0 3 0 0 1 3 1 3 3 2 0 0  
**probabilities:** 0.000 0.043 0.000 0.000 0.000 0.000 0.261 0.000 0.130 0.000 0.000 0.043 0.130 0.043 0.130  
0.130 0.087 0.000 0.000

left son=28 (12 obs) right son=29 (11 obs)

**Primary splits:**

Age < 28.5 to the left, improve=1.322793, (0 missing)

**Node number 15:** 38 observations predicted class=MSc expected loss=0.6578947 P(node) =0.38

**class counts:** 0 0 0 0 4 2 3 0 3 2 3 1 3 0 0 1 1 13 2  
**probabilities:** 0.000 0.000 0.000 0.000 0.105 0.053 0.079 0.000 0.079 0.053 0.079 0.026 0.079 0.000 0.000  
0.026 0.026 0.342 0.053

**Node number 28:** 12 observations predicted class=BA expected loss=0.6666667 P(node) =0.12

**class counts:** 0 1 0 0 0 0 4 0 0 0 0 1 1 0 3 2 0 0 0

**probabilities:** 0.000 0.083 0.000 0.000 0.000 0.000 0.333 0.000 0.000 0.000 0.000 0.083 0.083 0.000 0.250  
0.167 0.000 0.000 0.000

**Data Prediction**

*predicted= predict(fit,Data2\_test)*  
*predicted*

	B.com	B.E	B.Sc	BA
2	0.05555556	0.11111111	0.05555556	0.33333333
3	0.05555556	0.11111111	0.05555556	0.33333333
4	0.1904762	0.00000000	0.38095238	0.0952381
6	0.05555556	0.11111111	0.05555556	0.33333333
11	0.1904762	0.00000000	0.38095238	0.0952381
13	0.1052632	0.05263158	0.07894737	0.00000000
16	0.08333333	0.00000000	0.33333333	0.00000000
17	0.00000000	0.00000000	0.18181818	0.00000000
21	0.05555556	0.11111111	0.05555556	0.33333333
25	0.05555556	0.11111111	0.05555556	0.33333333
27	0.05555556	0.11111111	0.05555556	0.33333333
29	0.05555556	0.11111111	0.05555556	0.33333333

**Predicted result**

*summary(predicted)*

VI	B.com	B.E	B.sc
neg_class:164	neg_class:164	neg_class:164	neg_class:164
BA	BBA	DEEE	MA
neg_class:164	neg_class:164	neg_class:164	neg_class:164
MBA	MCA	ME	MSc
neg_class:164	neg_class:164	neg_class:164	neg_class:164

**X. FINDINGS AND INTERPRETATIONS**

The decision tree model output of the projected result is presented in Fig. 3.

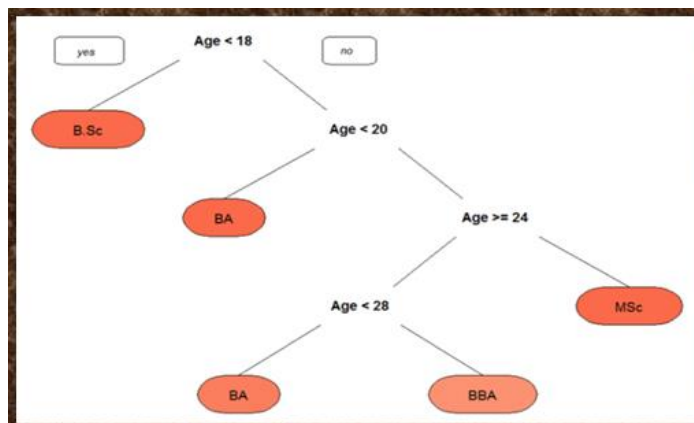


Fig. 3. Decision Tree model of the study

From the Fig. 3, it is clearly understood that at young age, the adults tends to commit suicide for simple problems. But when they grow, they could manage and solve problems of their level. The decision tree helps us to understand arts major students are more vulnerable to suicidal indention and in the age of 20-24, these students have forced to commit suicides. Many of them fail to cope up with issues related to relationships such as problems in friendships and love failure. Many of them commit suicide by these issues.



The decision tree model is constructed in depth-first fashion, node by node is shown in Fig. 4.

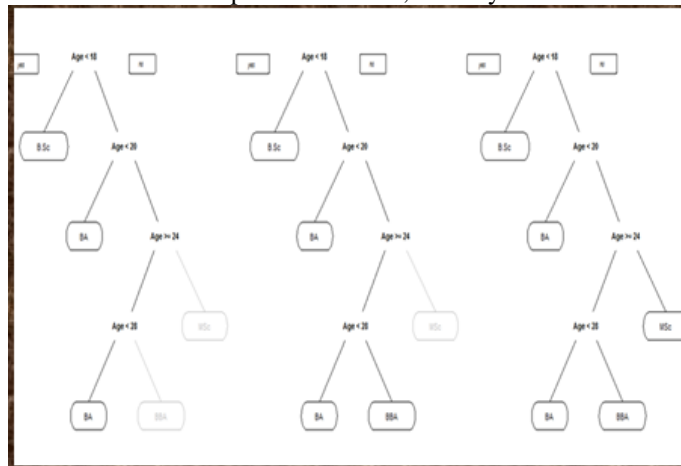


Fig. 4. Tree construction in depth-first fashion, node by node

#### A. Recommendations

There are many reasons for committing suicide. Some of the major problems are career pressure and relationship issues [13]. It happens because in the life of any normal person, the major events occurring are in the field of academics and relationships. Many teenagers and young adults are facing stress mainly due to these reasons, because all these are given high importance in an average person's life. The methodologies for committing suicides are easier and very common such as hanging themselves, eating poison, cutting wrists, setting oneself on fire, jumping in front of a moving train etc [14] and [15]. Because these easy methods, it does not require much working or planning and the time taken is minimum. Thus, rising rates of suicide among teenagers and young adults in Theni District is on alarming rate.

There are many ways by which we can curb suicides, on the personal front as well as on a large scale. On the personal front, we should make sure that everyone gets a friendly and supportive environment, at home, in school / college / work and everywhere. Also, if anyone seems to be depressed, extra importance should be given to them as much as possible and as early as possible. On a large scale, Government as well as Non-Government organizations should, either together or separately, ensure that proper care, guidance and advice has to be offered to the person who is in distress so that the suicide rates can be brought down. They should feel free to talk their problems – at home, in school / college, to friends and teachers or on the help lines. There is a need for broad based prevention programmers' which involve the high risk groups in social and interpersonal activities that help others. This may help in lessening sense of isolation and meaninglessness which stems from death of loved ones, failure in exams, impaired physical health and feeling unwanted.

So, this study suggests that there is something wrong with the way in which we are treating the people, who really need a friendly and supportive environment for their proper growth and development. The same study can be conducted in different districts. And the result of this study can also be implemented for the mental problems.

#### XI. CONCLUSIONS

This paper presents a data mining study of the factors influencing the suicidal ideation among adolescents in Theni district, Tamilnadu, India. This study uses decision tree algorithm to determine the age group of students who are victimizing to suicidal attempts. The decision tree algorithm and analysis of the data are presented in the study. The predicted result of the study is depicted as a decision tree model. Though the academic and relationship issues are the major cause for such ideation, the findings of this case study support the importance of psycho-educational involvement programs in the teen age to reduce and avoid victimization. Mental Health Professionals and Teachers should involve parents too in interventions related to intimidation among adolescents.

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