



Suicide Rate Predictions In Pakistan By using Neural Networks

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Abstract:

Suicide is the understudied subject in Pakistan that is a cause of death all over the world. Seventy-five percent of suicide occurs in LMIC. In Pakistan information about suicide is limited. The study is about to find the number of suicide from major cities of Pakistan and then predict the number of suicides by using Neural Networks Algorithm. About 24639 cases were found in our research from 2001-18 in major cities of Pakistan. Hanging and poisoning were the most common methods of suicide. The peak age of suicide committers was 20-35 included males and females. The lowest number of suicide was in Bahawalpur (130 from 2001 to 2018) and the Highest was in Lahore (5925 from 2001 to 2018).

Keywords—Suicide Rate, Pakistan, Age, Methods, Prediction, Neural Networks

I. INTRODUCTION

Suicide means to finish your own life. People consider it is a way to escape hi/her from pain and sufferings. When someone finishes their own life, we say that they "died by suicide." A "suicide attempt" means that someone tried to finish their life, but he/she does not die. The word suicide means purposely killing yourself. Suicide is a worldwide issue. In last year's suicide rate has increased in Muslims living in non-Muslim countries. In Islam suicide is strictly forbidden. Allah says in the Quran "And do not kill yourselves". The suicide rate in Pakistan is lower than in other countries. There are limited studies has been conducted in this field. A limited number of people in Pakistan conducted the study in this field but none of them predicted the suicide rate.

The main purpose of our study is to predict the suicide rate of major cities. We have predicted the suicide rate in Pakistan by using a neural network Algorithm. We made a data set on MS

Excel from different sources and prediction is done through MATLAB by using neural networks. Before this, nobody predicts the suicide rate in Pakistan. We used the numerical values in the data set because the neural network uses and predict the numerical values only.

A. Neural Networks

A neural network is a calculating model whose structure of layer is similar to the networked structure of neurons in the brain, in which each layer is connected with nodes. A neural network can learn from data set so it can be used to train the identify patterns, classify data, and predict future events. A NN breaks down your input into layers of intellection. It can be used to train over many examples to identify patterns in speech or images, for example, just as the human brain does. Its behavior is defined by the way its different elements are connected and by the strength, or weights, of those connections.

B. How Neural Networks Works

A neural network combines numerous processing layers, using simple elements operating in similar and stimulated by biological nervous systems. It contains an input layer, one or more hidden layers/processing layers, and an output layer. All layers are interconnected through nodes. In NNs every layer connected with the next layer and use the output of the last layer as input.

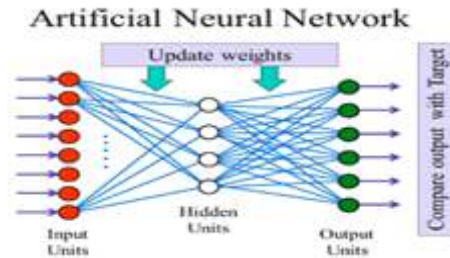


Fig : Neural Network Architecture

2. LITERATURE REVIEW

Suicide is a public serious health problem. It is the main problem in all over the world. Even the developed countries are facing this problem. Youth is commonly involved in this act. In United States America it is tripled between the ages of 15-24 . Another study was conducted in Karachi to calibrate the suicide pattern in Karachi like find the gender factor which is involved in this act, age, marital status, employment status, and monthly income. A study was based on the five-year police record taken from the fifty-four police stations of Karachi. From each police station, ten cases were taken. A total of 500 suicide cases were taken from police stations included incomplete information cases. Other cases were taken from NTC, JPMC was included making overall 700 suicide cases. After the findings, the conclusion was that mostly under the age of 30 males and females were involved in this act. Mostly the suicides were committed by males. Poisoning and hanging was a common method of suicide. Unemployment was a common reason for suicide. Suicide is mostly committed by married people. The data is collected from different towns of Karachi and police stations. The data filled in questionnaires were also entered in the final report. The sample size of the study was 700 suicide cases. The ages of men were 28

usually and it was 26 of females. .Another study was conducted in region Hunza and Gilgit-Baltistan. It studied the causes and effects of teenagers who have committed suicide in a specific region like Hunza by Qualitative It also finds the effects of suicide committer's young people and also explored how suicide methods have differed from one person to another or male and female. This paper finds whether this discernment is correct using FEMINIST METHODOLOGY. It conducted the information by personal interviews, finding the stories by their relatives in their own words because suicide is considered a shameless act among society and other people and does not tell a true story about death. This paper showed the major reasons like study stress lack of support failure in love affairs, etc. of suicide among teenagers and young people. According to senior citizens of Hunza usually, people from twenty-five to sixty years commit suicide, while among fourteen to twenty are minimum and forward from 1950 in Hunza region suicide increases among teenage people. The suicide ratio from Gilgit-Baltistan is not clear because they are not satisfied with figures and genders, etc. There are following reports from this region according to few resources researchers are as follows. According to the Pamir Times reported that from 1996-2016, there are 300 young people who have committed suicide .

According to the Times from 2005- 2015 GHIZER 369 people have committed. According to Burushal Times since 1995 260 people committed suicide in GHIZER. According to two researchers from 2000-2004, 49 ladies attempted suicide in GHIZER. When people attempt suicide they used very dangerous methods like hanging, jumping from a high peak and gun shooting are major methods. After, collecting the data of then divided it into two groups. After checking the sample they included 15 suicide case in which 11 were female and four male. Mostly suicide committed by 9th and 10th class students.

There are no official statistics or database on the suicide of in Pakistan. The national rate of suicide is not reported to the WHO. Due to fear of harassment people neither reported to police about suicide. People try to find treatment from private hospitals. Therefore incidences of suicide are under-estimated in Pakistan. The suicide information usually comes from sources

like newspapers, private hospitals and non-governmental NGOs.

A study was reported from thirty-five major cities of Pakistan. The average rate in Peshawar was 0.43/100,000 per year, 2.86/100,000 in Rawalpindi, 2.1/100,000 in Karachi, 1.08/100,000 in Lahore, 1.12/100,000 in Faisalabad (2006) and 2.6/100,000 in Larkana. The data show that the highest rate for men was 5.2/100,000 and for women, it was 1.7/100,000. The age of suicide committer was mostly between 20-40 years. It was reported that in the year of 2006, 5800 suicides have been committed in a one-month duration (Khan MM, Naqvi H. Suicide rates in six cities of Pakistan. Health Sciences Research Assembly, 2007).

DSH is one of the strongest predictors of future suicide. In DSH a training emergency room can contribute significantly to suicide prevention. The DSH leads to stigma for the avoidance of suicide. CIC (Crises intervention center) and SPHL (suicide prevention hotlines) are the best sources that can reduce the suicide rate used by Sri-Lanka. So it is necessary to establish such services in Pakistan. WHO has been recommended to school-based intervention to reduce the suicide rate among the youth. The allocation of resources for mental health is extremely low and wasted away due to dishonesty and mismanagement. Mortality of statistics should be collected through different source like the standard system of registration etc.

In the end, the suggestion is given that it is necessary for governmental, non-governmental administrations and public and mental health professionals to work with co-operation and took up this challenge.

A research conducted in Faisalabad city showed suicide patterns from 1998 to 2001, find out the suicide incidence, age of the suicide attempter, and the method of suicide i.e. hanging poisoning and material status-etc. This study covered 95 causes of suicidal death of different age groups at the Department of FM from Punjab Medical College at Faisalabad. During this study, a total number of 95 causes of suicide reported. 10.03% of the total of 945 autopsies reported. In 2000 it was found the highest rate of suicide. The average of suicide was 2.25 and the

lowest rate 1.67 was found in 2001. In Faisalabad the rate was found 1.12/1000,000 out of the four-year population with mean suicides for years was 23.75%. According to this research, the male's age grouped as 20-29 years and 10-19 years with 43.16% and 28.42% of the suicide. Whenever the female's age group of 10-19 years and 20-29 ages 35.89% and 33.335. 51.51% of people have used the method for suicide hanging. Male was not involved in this method, as compared to female. Some of them used a firearm with 18.17% and poisoning in 15.51. The conclusion is that the suicide rate is very low in Faisalabad as compared to other cities. A study was founded on Arksey and O'Malley's working framework of scoping review, combining peer-reviewed journals with ancient literature. This study will cover different aspects of suicide performance. Ten databases were searched from the beginning. Six-hundred studies were regained from ten databases. In the review, there were comprised of 11 articles, two theses, and one report. Mostly suicide is committed in urban areas of different cities, gender factor and age also discussed in this paper. Males were commonly involved in this act. Suicide behavior was mostly common younger than 30 years of age. Poisoning, hanging, and firearm were common methods. Mental illness was the reason discussed only in three studies. The risk factor was only discussed in this paper.

Another study shown the suicide trend with regard to population age gender and methods of suicides involved from the last ten years, and also target future prevention at Pakistan's city Bahawalpur. A survey has done in this research from the Forensic Medicine Department Quaid-e-Azam Medical College Bahawalpur. Khan MM identify suicidal rate from a range of 0.43/100000 in Pakistan's city Peshawar to 2.86 per 100,000 in Rawalpindi. In this study, it will target future planning and prevalent methods of suicide. This study was conducted 66 causes all those cases were included. The study in which police docket, history of suicide and autopsy report also included. The report is arranged in year groups 60 to 61. The mean age of the cases was 32.5+10.5 years from 2008 to 2012 and 29.6+12.9 was 2013 to 2017. In this study, 22 males and 16 females have reported. According to Ahmad et al. 52% most frequent method drowning also used for suicide in Chitral District. 11% was noted suicide through

firearms in 2013-2017. In the case of hanging 9% people attempt suicide by this method in the present study, but we compare it with a previous study 30% causes of hanging are observed from 2000 to 2015. Suicide due to poisoning raised only 4% in time duration 2013-2017 .

In recent years, to understanding the science of suicide many steps have been made. For example, current findings in public health, psychology, and neurobiology have shaped the etiological model of Suicidal behavior and underlined the high majority of certain psychiatric patients towards suicide. An overview of psychiatric indication involved in suicides to better notify the Pakistani legal system of developments in the psychiatric literature. In this paper, the legal implications of suicide in Pakistan has been discussed and evaluated the current trends in suicide and mental health in Pakistan .

Due to complex nature and public authorized taboos associated with suicide behavior, such behaviors are under-reported in our city, Suicide behaviors are not studied well in Pakistan and limited research has been conducted in this field. In Islamic countries, the suicide rate is lower as compared to western countries. But these findings are not a hundred percent true. According to another report, the attempted suicide rate is no lower in Muslims. The research about suicide and attempt suicide is limited in Pakistan. Pakistan never reported the suicide mortality rate data to WHO. Pakistan is an Islamic country the law of Pakistan is built on an Islamic basis. In Islam suicide is strictly forbidden.

Research Conducted in the last 80 years showed that suicide occurs in all cultures and societies in various stages of life. According to WHO mostly Pakistani people are suffered in mental illness and there is a lack of psychiatrists. Mostly Pakistani population lives in urban areas but psychiatric services are available in ruler areas. Study shows that suicide is committed by young people under age 30 mostly included married women .

The lack of cooperation between mental health care providers and the legal systems, fear of harassment by the police, and primary health care workers' inability to identify suicidal signs

and conduct risk assessments.

Suicidal Symptoms in depressed Pakistani patients are at high risk for suicide. A paper defined the amount of these indications in a group of Pakistani patients. Conflicting with the results of other Muslim countries, 45 percent of our patients showed suicidal psychopathology. Female patients displayed more suicidal ideation and major assassination was found between severity and period of depressing disease with these symptoms. These results are also deliberated regarding their importance in the initial recognition of these symptoms .

The majority of suiciders suffered from depressive illness. The reported rate displays that 40 to 70 % percent of patients with depressive disorder show suicidal symptoms. .Roy, A. Suicide in depression. Compr. Psychiatry paper defines the scope, pattern and harshness of suicidal symptoms in a group of depressed Pakistani patients the method used by the author for case records of depressed patients from the Department of Psychiatry, Mayo hospital Lahore on January 1992.

A total of 60 cases, 35 men and 25 women were involved in this study. This study shows that the risk of suicide is more in depressive patients and female depressives report more suicidal symptoms. The results of this study, however, did not support the observations from other Muslim countries where very low rates of suicide or deliberate self-harm have been reported .

From the year 2001 to 2004 a study conducted in district Ghizer. It is estimated that the mean average population of women for five years as 65.7 for females over the age of 15-year-old the rate of suicide is 33.22 per 100,000 and age from 15 to 24 rate was 61.07 per 100,000 in every year. The methodology and the results are reported in (Ahmad & Khan, 2005). Famous authors (SRK & AA) collected the data from multiple types of newspapers for the last five years (2000-2005) for suicide report witting in Ghizer. The newspaper report was based on police. To verifying these reports interviews and meetings were also conducted. This visit included police stations, health centers, and religious leaders. Questionnaire and personal interviews also conducted. The aim of this paper

is to focus on suicide in females, not males. The last population of Ghizer was 121,270 according to population census Organization from 2000-2004, 49 women devoted suicide in this city. In the report of Ahmad & Khan (2005) only 20% to 30% suicide cases were found from Police stations it means that the majority of data about suicide was not reported. This study highlighted that we need to develop such systems that diagnose and register the suicide cases in Pakistan.

Due to the lack of other means newspaper provides the best information about suicide in cities of Pakistan. In this study, the newspaper played a great role in the collection of suicide data. The newspaper reported the three hundred six suicides data from 35 cities of Pakistan.

There were only three reports available at this time. Two reports use the same information sources. According to the reports, 114 suicides were committed. Poison and drugs were common methods in both suicides.

Financial problems and unhappy love affairs were common reasons for suicide. The purpose of the study was to evaluate the pattern of suicide provided by newspaper reports. All suicides are provided by DAWN. It is the largest Pakistani English language broadcast that publishes daily suicide reports from different cities of the world.

Another research showed that 366 attempted suicide cases were testified from the Sindh Province over a four-month of time age. In which 38% of people survived and 62% died. In this study, the distribution of gender factor also reported. 70% of suicide are committed by men mostly rural areas form Province of Sindh. 83% among single, 51% single and 47% others. The highest suicide rate was 18.5% and 14.6% respectively reported. It also found the suicide rate in Pakistan's big city Karachi & Hyderabad among the rural and urban areas is 35.9% and 15.6%. In addition, the study showed the age factor and religion like Muslim or Hindus with the purpose of this study was to point The methodology for collecting of data were newspaper, local media, report, articles, and stories that were published in Daily Kawish and Ibra. The gender factor, the matrimonial status of

suicide sufferers, with religion, method of suicide and reason were collected from the report and then divided into 6 factors/categories like social, failure in love mental depression, etc..

The objective was to measure the available indication of the incidence, etiology, treatment, and avoidance of nervousness and depressing illnesses in Pakistan. This study was designed for a systematic review of available literature. Factors completely associated with nervousness and depressing disorders were female gender, mid-age, low level of education, financial problems, being a housewife, and relationship problems. Arguments with in-laws were completely related in 3/11 studies. The overall prevalence of anxiety and depressive disorders in the community population was 34% (range 29-66% for women and 10-33% for men. There are no proper treatment facilities available to them. The conclusion was that the available evidence suggests the main social reason for nervousness and depressing illnesses in Pakistan. Because of methodological problems this evidence is limited.

TA study conducted in city Faisalabad found the pattern of suicidal death varies from country to country. The aim of this study is to compare the suicidal death of Faisalabad with other countries. A total of 73 cases of suicidal deaths were included in this study. Data was collected from police stations, causes of death, autopsy findings and information from relatives & friends. Faisalabad town is 0.21/100000 of the population. Male to feminine quantitative relation is 3:1. The peak cases are found in the month of Feb. Firearms were the most typical methodology used for suicide as compared to hanging. Most vulnerable people in males was 20-29 years whereas in females 10-19 years.

Suicide is a big health problem in the world. According to WHO it is evaluated, that 85% of suicides have occurred in LMIC in the world. It is assessed that 9.3 per 1000,000 suicides are attempted in 2013. Mumford et al. completed a study of two decades ago by using the Psychiatric Personal Interviews in Chitral. They found that forty percent of females and fifteen percent of males were suffered from depression because they chose this topic as suicide by depression. Then they expanded the

sample of the population from one hospital and two mountain villages for a better understanding of suicide patterns. After this, they searched for the trend of suicide with reasons and methods. This study was based on cross-sectional in Chitral and Khyber Pakhtunkhwa. In this research, they collected 168 cases, were taken from out of 300 with the help of software by a 95% confidence interval. Some study was obtained from Research & Development, R&DD office in Peshawar, Pakistan. Interviews also conducted for information. It is not possible to find the whole population of this city due to limit time and resources. Therefore, Cluster Sampling Methodology was used for the selection of causes. A total of 168 cases were taken from Chitral. Primary data were collected through questionnaires in their local language. Questions were asked from hospital staff, police and NGO members. Roundabout 80% of information was collected through a survey and 20% from suicide committers' relatives. Secondly, they collect information from Databases WHO website and CDC. Data were examined/analyzed through SPSS software obtained data from personal health status. 168 causes were analyzed in this study. Amongst Low Middle-Income Countries in the six WHO areas, there is an almost three-fold range in the age-standardized suicide rate, from a low of 6.1 per 100 000 in the District of the Americas to a high of 17.7 per 100000 in the South-East Asia Region. One significance of the different suicide rates in WHO areas are that in 2012 the South-East Asia Region reported for 26% of the global inhabitants but for 39% of worldwide Suicide. More than 800,000 people suicides every year globally. The worldwide suicide rate is 11.4% per 100,000 population and 2.0 per 100,000 in Pakistan per year. A seminar "karwan-e-Hayat" was held to mark suicide prevention day. A Pakistani doctor Raza said that suicide attempter should be punished with jail. Regarding the statistics, 2012 75% globally suicide occurred and in which 39% occurred in the South Asia region. For the prevention of depression, The seminar was held in different cities of Pakistan. But due to insufficient resources and lack of coordination, no result founded. In 2018 due to depression, 1338 people died by suicide in Pakistan. Most of people who pass away by suicide were males (786), while 552 were females. According to this study, the ratio of suicide is very high among females. This study was conducted in district Ghizer in Gilgit-

Baltistan where the largest number of suicide has been reported last year. The results of the research mostly women cases of suicide are found in this region as compared to other cities.

3. PROBLEM STATEMENT

Limited studies have been conducted in this field. There is no official data available about a number of suicides committed to all over Pakistan. According to WHO Pakistan does not give the annual report of committed suicides. There is no such institute in Pakistan that collects information about the suicide rate that is increasing steadily. There is no such institute which aware of the people for the prevention of such activities. Question is this, why the suicide rate is increasing gradually? The question that has been increasing like fire and comes to the mind of every citizen these days is that can suicide be considered as the only option or solution for every problem in this society? Directly and indirectly, every person in our society is facing any problem in the daily routine of life. Some of them think that these issues and problems shall never solve but question is this why people consider that the solution to every problem is suicide. According to WHO in 2012, the rate of suicide in Pakistan was 7.5 per 100,000 people. In other words, around 13,000 people killed themselves that year in Pakistan. In 2016, the estimation was 2.9 per 100,000 i.e. over 5,500 ended their lives. Authorities say the number of people dying is likely somewhere between the two figures, but the truth remains hidden.

4. PURPOSED METHODOLOGY

Suicide is an act to eliminate her/his self intentionally. We searched suicide numbers in Pakistan for prediction.

- (1) Collecting the data from different resources i.e. Newspaper, past study and WHO
- (2) Make an Excel sheet with age group and number of male or female
- (3) Data Graphing on MS Excel
- (4) Simulation through Neural Network on MATLAB
- (5) Predict the number of suicide
- (5) Data analysis and reporting the results

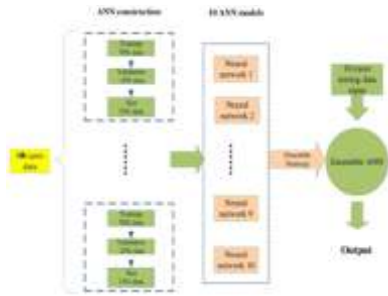


Figure 2 : Flow Diagram of NNs:

5. RESULTS

A. Regression Plot

R is a correlation between predicted values and observed values of Regression ANNs predict an output variable as a function of the inputs. The input feature (independent variables) can be categorical or numeric types, however, for regression ANNs, we require a numeric quantity. R Squared is always between 0 and 1. This shows how accurately your train model fits the dataset. If the value of R squared is close to 1 (good) then displays that your prediction is close to the actual dataset. If it is zero (Bad) then it shows that your model completely fails in making a correct prediction.

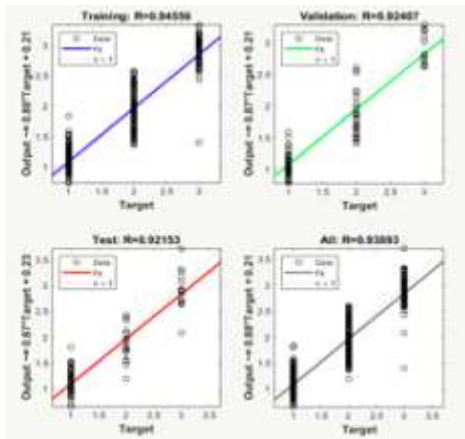


Figure 3: Regression Plot

B. Performance

In performance, there are four lines, train, validation, test and best. In fact, the best (dotted) line represents that other lines should lie on or near these dotted lines, then we can be confirmed that training has been done successfully. If any

of the three lines meet or pass near the best (dotted) line, it means convergence has been done. If this is not the case retrain the network.

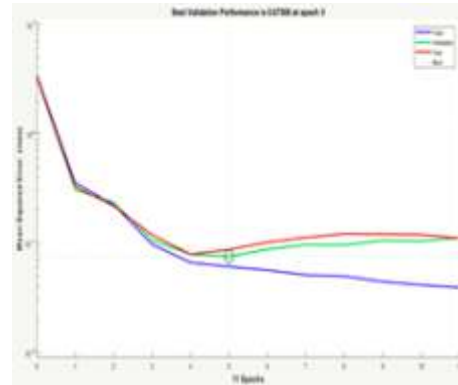


Fig : 4 Performance

C. Training State

It represents the current status of training at a particular time while training in progress. In our progress 6 validation errors are mentioned. It means when simultaneously 6 validation check error is produced then training will stop. Validation check error means that our dataset has some problems which mean that some instances are not understandable by the training algorithm. Because of data set problems these errors are generated. In our case 6 validation checks are used.

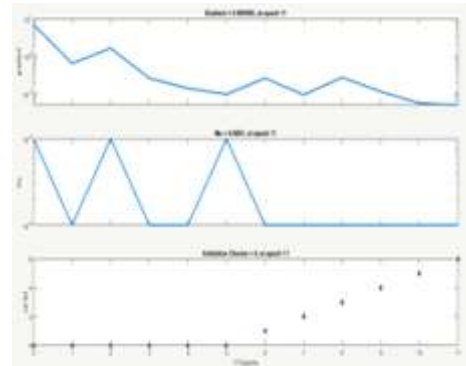


Fig 5 : Training State

5. CONCLUSION

Our study revealed that the number of suicide was 24639 from 2001 to 2018 in major cities of Pakistan. Hanging and poisoning were the most

common methods of suicide. The peak age of suicide committers was 20-35 included males and females. The lowest number of suicide was in Bahawalpur (130 from 2001 to 2018) and the Highest was in Lahore (5925 from 2001 to 2018).

For checking, our prediction we took 10 samples from each city randomly and applied to test on input testing and my network file for evaluation and got a simulated file that was stored simulated values. After that, for checking the error we made a loop and compared the simulated values with target testing values that were stored in the output testing variable. If the simulated value matches with target testing value then no error, otherwise error. In our prediction, there were 15 errors that were stored in variable e=15. To find the total number of samples we used the variable Total=length (output). It returned Total=80. For finding the correctness we used the Variable, correct=Total-e. It returned, correct=65. After that, we checked the accuracy of our prediction and used the variable Accuracy= (Correct/Total)*100. It returned the accuracy=81.2500. It shows that our Prediction is 81.25% accurate.

II. References

- [1] S. News, "Giving children the skills they need to tackle life's toughest challenges," pp. 1-6, 2019.
- [2] Z. Ahmad, K. Mobin, and S. M. Maqsood, "A STUDY ON THE PATTERN OF SUICIDE IN KARACHI PAKISTAN," vol. 30, no. 2, pp. 96-100, 2014.
- [3] S. Sher, "ETHNOGRAPHY OF SUICIDE : A TALE OF FEMALE SUICIDES IN DISTRICT GHIZER, GILGIT-BALTISTAN," no. 6, pp. 207-210.
- [4] C. Of, E. In, and G. Studies, "Teenage Suicide in Hunza (Causes and consequences) By Salma Khan," pp. 27-28, 2017.
- [5] M. M. Khan, "Editorial Suicide Prevention in Pakistan : an impossible challenge ?" vol. 57, no. 10, pp. 478-480, 2007.
- [6] M. F. T. H. E. Director-general, "The world health report 2000 Health systems : improving performance," no. March 2000.
- [7] F. Medicine and K. E. Y. Words, "Ahmad Saeed, M. Zahid Bashir *, Dilawar Khan **," Javed Iqbal, Khurram Sohail Raja, Anayatullah Rehman ***," pp. 12-15, 2019.
- [8] S. S. Shekhani, S. Perveen, S. Hashmi, K. Akbar, and S. Bachani, "Suicide and deliberate self harm in Pakistan : a scoping review," vol. 5809969, no. December 2016, pp. 1-19, 2019.
- [9] "Preventing suicide Preventing suicide."
- [10] Z. Ahmed, Q. Nisa, A. W. Yousufzai, S. Khoja, and J. Chaudhry, "IN PEOPLE OF CHITRAL, KHYBER."
- [11] T. N. Cheema, A. P. Qasim, U. Munir, and F. N. Cheema, "Changing Trends in Suicidal Deaths over the Past Decade – An Autopsy Based Study at Bahawalpur," vol. 12, no. 2, pp. 154-157, 2018.
- [12] M. Editor et al., "Suicide and Its Legal Implications in Pakistan : A Literature Review," vol. 9, no. 9, pp. 1-6, 2019.
- [13] I. V. Res et al., "The relationship between suicide and Islam : a cross national study Abstract :," vol. 2, no. 2, pp. 93-97, 2019.
- [14] T. A. Khan, "Canvas Logo (/) ," pp. 1-4, 2019.
- [15] S. Z. Hospital, "Suicidal Symptoms in Depressed Pakistani Patients," 1992.
- [16] M. M. Khan, A. Ahmed, and S. R. Khan, "Female Suicide Rates in Ghizer, Pakistan," vol. 39, no. April 2009.
- [17] M. Khan, "The Pattern of Suicide in Pakistan," no. September 2015.
- [18] M. Khan, "Suicide and Attempted Suicide in Pakistan," no. June 2016.
- [19] M. Babbar and A. A. Qazilbash, "Unemployment, poverty and declining socioeconomic status associated with increased suicides among Pakistani youth : a case study of 366 attempted suicides in Sindh," 2004.
- [20] I. Mirza et al., "Risk factors, prevalence, and treatment of anxiety and depressive disorders in Pakistan : systematic review," vol. 328, no. 7443, 2019.
- [21] A. Siddique, "Pattern of Suicidal Deaths in Faisalabad," no. 1, pp. 35-40, 2013.
- [22] H. Rights and C. Report, "Depression and Mental Health Issues : Rise in Suicide Rate in Pakistan," pp. 2-6, 2019.