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Investigative Nexus of Depression-Anxiety Disorder in Pakistan Pre and Post-pandemic COVID-19: Coro-Nomic Analysis

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Keywords

Abstract

Background: Depression and Anxiety disorder is a global health problem, In each country has a different number of patients due to COVID-19. COVID-19 tottered the entire world and started more aggravation and lingering on with devastated perspective economic smite started in many countries, economies tumble down because of COVID-19 in such circumstances people start suffering from the Depression-Anxiety disorder.

Aims: The study objective is to investigate the staggering rate of depression and anxiety disorder in Pakistan before and after COVID-19 and compare the symptoms of COVID-19's Impacts on triggering the rate of Depression-Anxiety disorder.

Methods: We use the statistical descriptive method and Coronomic analysis for income relation with Anxiety-Depression disorder, further we applied multiple regression analysis to support the results and analyze the three parameters as samples to support the results ß0,ß1, and ß2 we used p-value P>0.9 for the present research survey.

Results: The overall prevalence rate of Depression-Anxiety increased due to the COVID-19 lockdown and started financial and economic suffering, the overall prevalence rate according to the present research was 43% this rate may be increased if include more population with accurate information and way of methods.

Conclusion: COVID-19 increase the level of Anxiety-Depression disorder in the general public than before, comparing to the level of Depression-Anxiety exist more in women compare to men, Young population with age

30-50 years are more suffered than other age groups, apart from this COVID-19 also causes many other social issues to arise which also causes of Anxiety-Depression disorder.

1. Introduction

Nowadays in Pakistan Depression and Anxiety is major public health issue which is exacerbated now very highly, although before COVID-19 the prevalence rate was less but after the pandemic COVID-19 it increased dangerously (Ali.et.al,2022). Apart from this Pakistan is a developing country 65% population of the country is leading a life below the poverty line and 70% population of the country has only 1-time food a day, most people work on daily wages and earn daily for their family's survival in a different form of business and income source (Ali.et.al,2022). Due to COVID-19 the economic survival of daily wages people have completely disturbed and they have no other means of sources for livelihood they start financial suffering, the ratio of Depression-Anxiety pre-OVID-19 was 27% but after COVID-19 the ratio increase dangerously and left unprecedented facts economically, socially and socioeconomically(Ali. et.al 2022).

After COVID-19 the prevalence of Communicable and Non-Communicable diseases increased due to suffering from natural disasters in the form of floods, economic crises, financial crunch, market volatility, and business collapse both micro and macro in the commercial sector, recent flood disasters in three province of Pakistan also damaged the Pakistan economy with $47 billion including cattle's, shelter food and financial loss (Ali. et.al 2022). As COVID-19 become a global disease and almost the entire world suffers from this pandemic in China there was complete shutdown people also suffered in their businesses (Wang C, 2020). In the past, there have been several diseases in the world SARS, Malaria, in Pakistan dengi disease spread by Mosquito biting (Feldmann H, 2003). In Middle East Respiratory Syndrome, Ebola Virus, etc. (Team N-O, 2009). In Coronavirus infection initially patient catch fever, after that feels severe chills, dry cough with high breathing problem, sore throat problem, giddiness, nausea and vomiting, and headache, feels feeble and weak, and in days gets too flimsy and fragile even unable to do some hard work also have diarrhea. If patients have already a history of disease so there would be more chances to get COVID-19 with worst outcomes (Chen N, 2020). Primitive disease cases may have heart problems, heart attacks or cardiovascular disease and respiratory failure, acute respiratory pain, or even death (Holshue ML,2020). Including the aforementioned disease, COVID-19 has a serious mental effect in the form of Depression-Anxiety, mental stress, and mental health (Huang Y, 2020). In Pakistan after the outbreak of COVID-19, huge psychological outcomes have been observed, this outcome exists in the entire population individually, as a community, or as a society at an overall country national level condition, people are afraid and feel fear of sick and dying feeling helpless (Hall RC, 2008). COVID-19 have a high impact on public mental health which is further converted into mental stress and leads to Depression-Anxiety(Xiang Y-T,2020). COVID-19 instills fear inside the public which further increases psychological impacts on the entire public individually which further instigates Depression-Anxiety in every profession of people also people which are working in the health industry(Zhang J,2020). Usually, the employment public also starts suffering from mental illness because of job and income problems this would lead to more economic and mental health impacts, especially on youth (Ricci-Cabello 1, 2020). The physical health of the public is associated with mental health if the person has good physical health they can perform better and earn well and consider psychologically fit on the opposite side it will consider psychologically unfit (Marzo RR, Frontier 2022). During the COVID-19 pandemic, most of the public in the world get exhausted and feel psychological huge stress in the form of Depression-Anxiety and these are correlated with each other COVID-19 and high levels of mental illness and stress (Marzo RR, Frontier.2022). The rapid spread of Corona Virus COVID-19 spread fear and panic among people and also gave a psychological shock (Brackstone K, Marzo RR, 2022). With the prevalence of COVID-19 environmental change also impacts public life which creates further mental stress and deepens psychological issues and mental stress (Ridzuan, A. R.2022) with the high psychological impact of financial suffering, FDI Foreign direct investment also disturbed which develop the high level of Depression-Anxiety stress (Ridzuan, A. R 2022). After the spread of COVID-19 the vaccine for epidemic disease was another big challenge some people were afraid to inoculate with

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the vaccine some are willing that was another stress for the public to deal with the COVID-19 vaccine (Marzo RR, 2022).

2. Methodology Aims and Objective

The study was carried out among the general population of Pakistan with systematic random sampling analysis we consider the age more then 18 years old participants we use descriptive statistics method to support the results used frequency distribution for result analysis, in the research survey we include different age groups 18-35, 36-50 and 51-70 years, with male participants numbers (n=1300) and female participants numbers (n=445) and educated number of people (n=1267) and uneducated numbers (n=478), In results it realize that number of male patient before COVID-19 were (n=465) and female was (n=188) and after COVID-19 the rate of Depression-Anxiety increased due to many reasons staying at home all time, financial suffering and loss, uncertainty about future perspective so the number of patient increased after COVID-19 the male participant after COVID as (n=812) and in female the number of Depression-Anxiety was (n=355), as it can seen from results that prevalence rate of Depression-Anxiety after COVID-19 is near to double and almost more then two quarter population of the country suffering from Depression-Anxiety disorder, public also suffering economically. We analyzed the data of 1745 participants using the Depression-Anxiety scale to measure the primary symptoms of outcomes.

Participants include research surveys from across the entire country 5 provinces Punjab, Sindh, KPK Khyber Pakhtun Khwa, Balochistan, Azad Kashmir, and Gilgit Baltistan. The study is cross-sectional research to observe the prevalence rate of Depression-Anxiety before and after COVID-19 and its associated factors health issue and economic problems and loss due to COVID-19 and health financing and evaluation for the Depression- Anxiety perspective. In inclusion and exclusion criteria survey included all male and female participants educated and uneducated across all countryside above 18 years and ages less than 18 years excluded, further almost 500 participants were also excluded because of missing information such as educational background missing identical information we excluded those participants rest of the participants

1745 out of 2345 include who signed the consent form for participation.

Statistical Analysis

Number of Participants according to demographic profile, Male and Female, Age group, Educated and Uneducated,

Table 1: Demographic Profile of participants

Variables	Portions (n)
Age groups	
18-35	972
36-50	560
51-70	213
Gender	
Male	1300
Female	445
Education Criteria	
Educated	1267
Uneducated	478

Table 2 describes the descriptive statistical analysis of the participants regarding Depression-Anxiety disorder and the level of disease after COVID-19 with CI 95% and SD $\pm$ 379 and 219 as s sample. Whereas Table 3 consists of multiple regression analysis of the model we use 3 groups for 3 salaries so the total values become 9, 3×3=9 Table 4 shows the value of the income profile with as an independent variable we applied multiple regression analysis for income impacts on Depression-Anxiety disorder on participants we analyze the three parameters in income variable including intercept value, total number parameter estimates 3 number of values 9 Table 4. VIF value for multicollinearity is 1.33 for variable age group 36-50 and 51-70 years old, R2 with other variables is 0.25 with P value P>0.9, and for intercept standard, p-value used P>0.05. Fig 1 shows the estimated parameter details as a sample from 9 group values. The sample parameter estimated is $\beta 0, \beta 1$, and $\beta 2$.

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Descriptive Statistics Method

Table 2: Descriptive Statistical Analysis of participants according to participant's profile and according to Anxiety-Depression prevalence from the entire country

Total number of values	3	1	1	2	2
Number of excluded values	0	0	0	0	0
Number of binned values	3	1	1	2	2
Minimum	213	1267	478	188	355
25% Percentile	213	1267	478	188	355
Median	560	1267	478	326.5	583.5
75% Percentile	972	1267	478	465	812
Maximum	972	1267	478	465	812
Mean	581.666666666667	1267	478	326.5	583.5
Std. Deviation	379.963594747356	0	0	195.868578388674	323.147799002252
Std. Error of Mean	219.372083709644	0	0	138.5	228.5
Lower 95% CI of mean	362.215228137461			-1433.3093559602	-2319.86778221592
Upper 95% CI of mean	1525.54856147079			2086.3093559602	3486.86778221592

Table 3: Multiple regression analysis of variance according to the income profile of participants

Model						
Analysis of Variance	**SS**	**DF**	**MS**	**F (DFn, DFd)**	**P value**	
Regression	0.000	2	0.000	F (2, 6) = 0.000	P>0.999	
Age Group	0.000	2	0.000	F (2, 6) = 0.000	P>0.999	
Residual	1950000000	6	325000000			
Total	1950000000	8				
Parameter estimates	Variable	Estimate	Standard error	95% CI (asymptotic)	|t|	P value	P value summary
β0	Intercept	25000	10408	-468.3 to 50468	2.402	0.0532	ns
β1	Age Group[36-	0.000	14720	-36018 to	0.000	>0.999	ns

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	50]			36018	9	
β2	Age Group[51-70]	0.000	14720	-36018 to 36018	0.000	>0.9999	ns
Degrees of Freedom	6					
R Squared	0.000					

Table 3.1 : Consist of different test D Agostino pearson(K2), Anderson darling A2, Shapiro Wilk(W) and Kolmogorov-Smimov tes

Normality of Residuals	Statistics	P value	Passed normality test (alpha=0.05)?	P value summary
D'Agostino-Pearson omnibus (K2)	3.040	0.2187	Yes	ns
Anderson-Darling (A2*)	0.8869	0.0134	No	*
Shapiro-Wilk(W)	0.7756	0.0107	No	*
Kolmogorov-Smirnov (distance)	0.2923	0.0257	No	*

Multicollinearity	Variable	VIF	R2 with other variables
β0	Intercept		
β1	Ag Group[36-50]	1.333	0.2500
β2	Age Group[51-70]	1.333	0.2500

Fig 3: Showing the residual and predicted value, according to the income status of the participant and its impact on Depression-Anxiety disorder
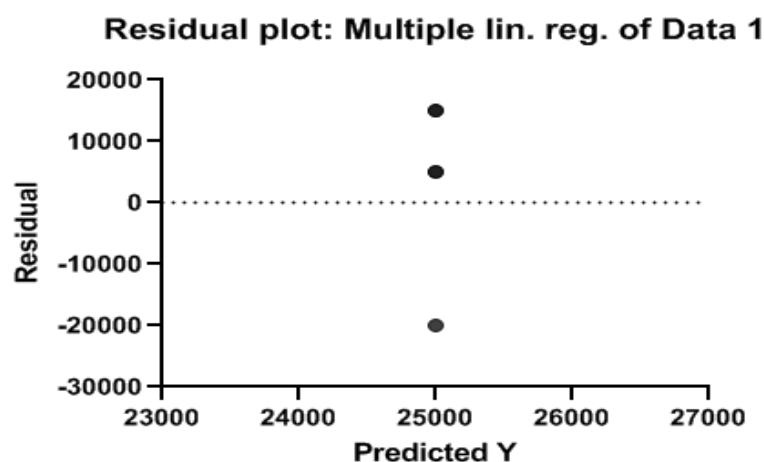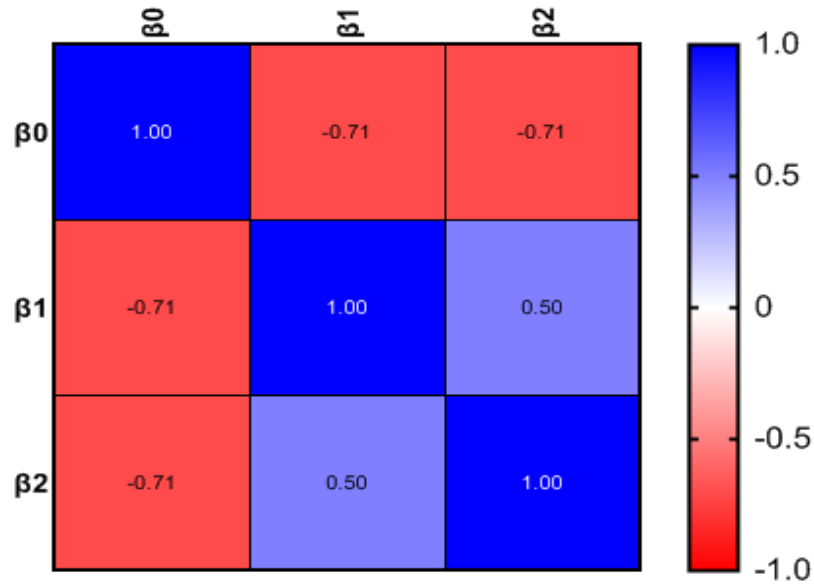

Fig 1: Parametric covariance of estimated parameters with values -0.71,0.50 and 1.00.

Source: Author Research

Fig 2: Multiple regression graph explaining the actual and predicted Y Income value of participants
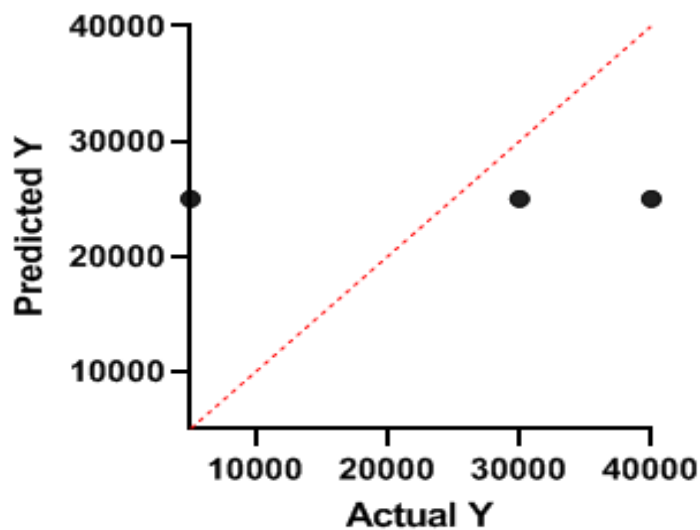
Fig 2 and Fig 3 Source: Author Research

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Coro-Nomic Analysis:

Table 4: Income Status of Participants

Age group	Income	Currency Unit
18-35	30000	PKR
	40000	PKR
	5000	PKR
36-50	30000	PKR
	40000	PKR
	5000	PKR
51-70	30000	PKR
	40000	PKR
	5000	PKR

According to Coronomic Analysis[1] we divided the participant's group into three income status profiles the lowest income per month considered 30,000 PKR the Middle income consider 40,000 PKR and the highest 50,000 PKR and .

3. Results

From the present research results it is realized that the adult age group 18-35 years age are suffering almost 50-78% Depression-Anxiety disorder due to uncertain circumstances, unsecured future, health problems, educational loss, lack of quality education, improper way of teaching in College and Universities, high rate of inflation and increasing rate of unemployment, domestic issues, family survival problems and so many other factors which are triggering the issue of Depression-Anxiety in 18-35 years old adults, On the other hand prevalence rate among the age group 36-50 years old are almost 45-72% because the participants in this age group mostly prefer to go aboard for better future of their families, and the people who don't wish to go abroad stay in Pakistan mostly do jobs or business before COVID-19 the people in this age group are happy because they have stable business and way of income was secure after COVID-19 as the entire business

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[1] Coronomic Analysis: The analysis which deals with economic perspective during Corona Virus COVID-19 time is considered to be Coronomic Analysis.

industry was shut down globally, market volatility was all time high, supply-demand was completely disrupted, manufacturing factories was shut down, offices and financial institutions stop their operations, so because all this aforementioned issues this age group also start suffering psychologically which trigger the issue of Depression-Anxiety disorder more compare to few month and year ago. In the last age group 51-70 years the prevalence rate is 20-30% only because at this age most parents depend on their children's income because of a joint family system like the traditional family culture of Pakistan and if some families don't have this source they depend on their government pensions and another way of income e.g agriculture income or some other business.

If we compare the results between gender males and females almost both have the same rate of prevalence in males the prevalence rate is 45% and in females, it's 55% in females the prevalence rate is a little high because in Pakistan the domestic lady mostly stays at home and do the homework from dawn to dusk and male partner earn income for the survival of his family so being alone all the time the prevalence rate in women are more then men. In comparison to educated and uneducated results of Depression-Anxiety, the prevalence rate is much high in uneducated participants compared to educated participants the reason educated participants are confident to get a job in the future even if they don't have a job that time they can go abroad for further study or either for job purpose apart from this they also confident to do business so the prevalence rate is less compare to uneducated participants the prevalence rate is almost 10% and in uneducated participant, the prevalence rate of Depression-Anxiety is 40-70% which is very high and alarming because the uneducated population is the burden on society economically financially and socioeconomically which create further mental stress and illness.

Overall the prevalence rate of Depression-Anxiety disorder was 2000 to 2018 was 28% and after COVID-19 it increased dramatically due to financial and economic suffering and also COVID-19 out-breaking afraid people for high morbidity rate. Mostly the public who suffer from Depression-Anxiety also have other chronic and non-chronic diseases in the form of CD Cardiovascular disease,

heart problems (Myocardial), diabetes, hypertension, blood pressure, dyslipidemia, obesity problems and so many others which decrease the life span of the patient than a normal person.

Economically Depression-Anxiety disorder prevalence in different age groups is different the mean group for the sample size we select is 36-50 years old which is mainly employed and the businessman section of the society in the first and last group 51-70 years older population student in the first group 18-35 years old so they depend on parents but nowadays also some students try to finish study early and go for job and business the prevalence rate of Depression-Anxiety disorder in this group are mild 53.5% and middle or moderate level 14.07% and severe or extreme level of prevalence is 24.9% in the age group 36-50 years old the prevalence rate of Anxiety-Depression disorder economically normal 63% and mild 58.07%, moderate or middle level 17.8% whereas severe level is 32%, in last group 51-70 years old population the prevalence rate of Anxiety-Depression economically is normal 23%, mild level 16.5%, middle level 12.06% and severe level is 7.5%.

4. Discussion

During the time of COVID-19, the prevalence rate of Anxiety-Depression disorder among the general public increased because of lock-down policies due to lock-down the business and sources of income were destroyed so the general public suffer a lot and the prevalence rate increased dramatically compared to the year before (Ullah, I., Ali, S., Ashraf, F., et al. 2022). Apart from this urban and semi-urban areas suffered a lot due to the COVID-19 lockdown and the population in these areas becomes psychologically patient and suffered from Depression-Anxiety more than the rural areas(Gulf news, 2020) the reason behind this is the majority of the urban population depends on jobs and private work or some microfinance business due to lock-down policy there business shut down and reserve also finished so they don't have an alternate way of income on the other side the rural area population depends on agriculture even if they don't have the proper way of income agriculture income still enough for them to pass the time. This is a fact almost the entire world urban population of the world suffered more same in China urban population suffered more than the rural population because the major population of china depends on international trade

and business and these people lived in cities due to COVID-19 lock-down their businesses shut down and they suffer millions of loss individually and at state level China suffer trillion of dollar loss during the pandemic period (Liu et al., 2021). In our present results, it is clear that the prevalence rate of Depression-Anxiety disorder is increased and the major population which suffers from this pandemic situation is between ages 30-50 years old and many psycho patients also suffered from the shutdown of clinics and healthcare centers and OPD ward and psycho patients are unable to go for a doctor for their treatment this situation also trigger the Depression-Anxiety disorder (Dawn news, 2020). That was also very hard and difficult to monitor and evaluate the public mental health condition during the pandemic COVID-19 the state failed to prevent the public from mental disease stress Depression-Anxiety disorders almost Depression-Anxiety penetrate in public in a tricky way (Dong & Bouey, 2020). Another reason for Depression-Anxiety aggravation is political instability, economic uncertainty, high inflation rate on edible things in the supermarket, market volatility, devaluation of currency rate on a daily basis, energy crisis, unemployment unsecured future, and many other local and international factors which have a direct and indirect link with the public regarding foreign policy and international relations these all factors directly impact on public mental health and increase the Depression-Anxiety rate (Ali,et. al 2022). The stress rate among the general public of Pakistan is increasing but the people who lived abroad for employment study and business purposes are also disappointed with the present situation of Pakistan Depression-Anxiety also increased among the diaspora of Pakistan because their families are living in Pakistan.

In females, the prevalence rate of Depression-Anxiety is more than in males because they have to deal with their husbands and do all the home errands and stay at home all-time dealing with their in-laws and bear the arguments of husbands and their families so because of the conservative traditional culture of living in joint family system impacts more on females and the prevalence in female are high rate compared to male (Winkvist A, Akhtar H. et.al). Economic reforms are very essential to decrease the disease level and bring overseas investment FDI foreign direct investment in a country can reduce the level of the Depression-Anxiety in public and provision subsidies to the public on edible things and

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decrease energy prices, providing subsidies to farmers for agricultural production of various crops wheat, barley, weed, and so many others by applying these measures can reduce the level of Depression-Anxiety albeit it will not finish but can be minimized and controlled from the further prevalence (Jenkins R et.al). We also realize different other factors of Depression-Anxiety disorder in Pakistan gender, race, color, modern and old lifestyle in urban and rural public, and the authoritative and dominant style of husband on wife increase the mental disorder level in females (Albert P. 2021), relational issues and income and job issues in offices commanding style of seniors on juniors, racial discrimination, rights exploitation, rich and poor discrimination, these are the major factors which increase the level of Depression-Anxiety disorder mental stress and illness(Lai J., Ma S., Wang Y.).

5. Conclusion:

We found that the prevalence rate of Depression-Anxiety disorder is more in women compared to men and young men from ages 20-50 years old are more depressed than older people. The prevalence rate is very high and it is not stagnant still increasing its duty of the state to apply some possible measures to remove the tension and Depression-Anxiety from society, Urban population suffered more than the rural population, Income is the major factor of Depression-Anxiety in the entire country apart from this social and domestic family issue also trigger the rate of Depression-Anxiety disorder. COVID-19 increases the level of Depression-Anxiety by almost 43% in the entire country this rate may be increased if include the entire population for results. More ever there is also a lack of proper health infrastructure especially in rural areas there is very few facilities of health are available in major areas there is no Psychiatric doctor available, no proper health monitoring system lack of health practitioner also cause of Depression-Anxiety.

Now it's the duty and obligation of state and health practitioners and health policymakers to bring health reforms and provide awareness to the general public about Depression-Anxiety disorder and open some new health centers for the treatment of these diseases that can be precluded for further prevalence.

Declarations

Ethical Approval and Consent to Participate

The current research study was designed, reviewed, and approved by Research Management Board (RMC) MEDIU Al-MADINAH International University, and we completely adhere to Research Ethics and Governance. The current research project is run by (Principal Investigator) Muhammad Ali & research team. Each co-author has participated in the project start-execution-end. We solely declare that we have participated in the above health research project related to "Investigative Nexus of Depression-Anxiety disorder in Pakistan pre and post-pandemic COVID-19: a Coro-nomic analysis ".

Availability of data and materials
Data cannot be revealed due to the respondent's confidentiality. However, If any author is in dire need, it may be granted with the permission & consent of the respondents and upon the author's reasonable request. Data can be requested here "MUHAMMAD ALI" emil: alimuhammad1447@gmail.com

Competing Interest
There is no competing interest exists between authors

Author Contributions
Principal investigator Muhammad Ali started this research project & conducted a survey in Pakistan and participate in analysis and writing, and all authors paticipate equally.

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