INTRODUCTION

Anxiety and depression are serious mental health problems, causing high morbidity around the world. Adolescent age, when student joins high school is crucial for an individual's mental development and as such efforts must be focused on solving problems like stress, anxiety, and depression.1 Treating such conditions is not an easy task considering the multifaceted physical, mental and biological changes that an individual goes through during this period.2 Mental issues during this age are a major burden on the health system and particularly because of their importance in an individual's growth. If left untreated, psychiatric disorders might have an impact on the overall life of an individual ranging from poor grades in school to abuse of substances, and in extreme cases, even suicide becomes a possibility.3
According to World Health Organization (WHO), the results of several studies show that the occurrence rate with regards to psychiatric disorders is around 22% in various settings. A report published in 2015 on the global burden of depression and other mental disorders reported 322 million people as suffering from depression over the world. This had increased by 18.4% from 2005 to 2015. The prevalence varies among different ages with 8.7% prevalence globally in children aged 15-19 years. One of the studies conducted amongst boys from a secondary school in Saudi Arabia revealed 41% of the students suffering from depression, half of them reported to have anxiety and stress was found in approximately 35% of the boys. A different study conducted in a secondary girl’s school in Abha, Saudi Arabia showed 42% of the girls suffering from depression with 68% of the total population experiencing anxiety while around half of the girls suffering from stress. A study on emotional and behavioral problems faced by school going children of Karachi reported higher prevalence as compared to other countries. In another recent survey in Rawalpindi, one in four adolescents in public schools of rural Rawalpindi were identified as psychosocially distressed.

Several risk factors of anxiety and depression has been identified from previous literature which include family and personal history of depression, academic difficulties, economic instability, diagnosis of a serious illness, death of a loved one, separation of parents, alcohol consumption, planning and / or attempt to suicide. A study also reported that depression could be related to academic difficulties resulting in the loss of interest in daily activities.

Pakistan’s rapidly growing population reflects the need to build an evidence-based policy for developing effective strategies to tackle the menace of anxiety and depression and its related disorders. Not enough data and information is available to understand the magnitude of this problem in our young population. Hence our objective was to estimate the prevalence and assess the risk factors associated with anxiety and depression among high school students in Karachi, Pakistan.

METHODS

This cross-sectional study and was carried out in October - November 2020 in government and private high schools of all four districts of Karachi after obtaining ethical approval from Institutional Review Board of Jinnah Sindh Medical University (JSMU/IRB/2020/330). Two staged cluster sampling technique was used to select schools and study participants. At first stage, a list of all schools and colleges providing higher secondary school education in Karachi was obtained from Sindh Education Department. In the second stage, ten schools were selected from each district and approached for data collection. There were some schools from District South and District West which refused permission for the study due to COVID and privacy reasons. Those schools were dropped whereas schools that granted permission were followed up. Hence three-four schools from each district were finalized for data collection. Sample size was calculated from OpenEpi calculator, with previous prevalence of 57.65% in school going adolescents. Taking 5% precision and 95% confidence level, sample size came out to be 376. However, it was inflated to 400 to account for missing data with 100 study participants recruited from each district. All students of the selected schools were eligible to participate in the study. There were some students who refused to participate in the study citing reasons of discomfort and fear of parent’s disapproval. They were then excluded from the study. Students were recruited by applying non-probability convenience sampling technique due to COVID restrictions.

Data was collected on age, gender, type of school, family history of anxiety and depression disorder, parents’ profession, other physical disability and educational history. Aga Khan University-Anxiety and Depression Scale (AKU-ADS) questionnaire was used to assess the prevalence of anxiety and depression among high school students after obtaining formal permission from authors. This is a 24-item, 5-point Likert Scale (always, mostly, sometimes, never, don’t know responses) validated tool with a score of more than 19 indicating some form of anxiety and depression. The anxiety and depression scale was found reliable in our respondents. The scale used in the study showed good reliability with Cronbach’s Alpha of 0.824.

The selected schools were approached by the principal investigator and formal permission of relevant authorities of school was taken. Consent forms were handed over to the principal to take the permission from the parents of those students who were below the age of 18 years while written consent was taken from students aged 18 and above. In both the cases, participants were also informed about right to refuse or withdraw at any stage of study. They were assured that their privacy
would be respected and responses received would be kept confidential. The filled forms were assessed to check whether the questionnaire has been filled completely and correctly. At the end of the study, students, parents and principals of schools were also provided with a list of psychologists and psychiatrists working in government and private sector of Karachi for referral upon diagnosis of anxiety and depression.

Data was entered in Statistical Package for Social Science (SPSS) version 20. After cleaning, data was analyzed in the same package. Frequencies, distribution and percentages were calculated for categorical variables. To determine the relationship between factors and outcome, Odds Ratio with 95% confidence level was calculated using univariate and multivariate logistic regression analysis. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The total sample size was 400 students with mean age of study participants reported as 17.23 ± 1.11. Majority, 61.5% of the participants belonged to the age group 15-17 years with 72% females. There were 61.2% of the participants from private schools with 57% of the students reporting good academic grades and 91.7% of them never failing in previous class. There was no physical disability in 99% study participants and 91.5% didn’t report any history of recent trauma. There were 15.5% of students who reported a positive history of anxiety and depression in their fathers whereas 19% of students reported a positive history of anxiety and depression in their mothers (Table-I).

| Variable | Mean ± SD |
|----------|-----------|
| Mean Age of Study Participants | 17.2 ± 1.1 |

**Age in Categories**

| Category | % (n) |
|----------|-------|
| 15-17 Years | 61.5 (246) |
| 18-19 Years | 38.5 (154) |

**Gender**

| Gender | % (n) |
|--------|-------|
| Male | 28 (112) |
| Female | 72 (288) |

**Type of School**

| Type | % (n) |
|------|-------|
| Government | 38.8 (155) |
| Private | 61.2 (245) |

**Grading in Studies**

| Grade | % (n) |
|-------|-------|
| Excellent | 22 (88) |
| Good | 57 (228) |
| Satisfactory | 17 (68) |
| Unsatisfactory | 1.8 (7) |
| Don’t Know | 2.3 (9) |

**Ever Failed in Previous Class**

| History | % (n) |
|---------|-------|
| Never | 91.7 (367) |
| Yes | 8.3 (33) |

**Physical Disability**

| History | % (n) |
|---------|-------|
| No | 99 (396) |
| Yes | 1 (4) |

**History of Recent Trauma**

| History | % (n) |
|---------|-------|
| No | 91.5 (366) |
| Yes | 8.5 (34) |

**Father History Of Depression/Anxiety**

| History | % (n) |
|---------|-------|
| No | 84.5 (338) |
| Yes | 15.5 (62) |

**Mother History of Depression/Anxiety**

| History | % (n) |
|---------|-------|
| No | 81 (324) |
| Yes | 19 (76) |
mothers were not having anxiety and depression respectively. Students of private schools (OR 0.39, CI 0.21- 0.69, p-value = 0.002) and whose mothers were housewives (OR 0.28, CI 0.09 – 0.83, p-value = 0.022) were less likely to develop anxiety and depression as compared to others (Table-II).

**DISCUSSION**

This is perhaps the first ever study conducted to assess prevalence of anxiety and depression among high school students in four districts of Karachi in Pakistan. The results of this study show that prevalence of anxiety and depression in high school students was quite high. This finding is similar to another study that was carried out in Haryana, India, that found similar prevalence of depression among school going adolescents.\textsuperscript{17} Due to similar cultural contexts, this finding can be explained.

Our study also found a high prevalence of anxiety and depression among our female participants. The finding of this study is consistent with numerous other previous studies conducted on same populations with higher prevalence reported among female students. A study conducted at Al-Qassim region in Saudi Arabia found similar prevalence of anxiety and depression in female students.\textsuperscript{2} Another study carried out in India also found higher prevalence of depression, anxiety and stress in females.\textsuperscript{15} A similar study conducted in India on prevalence and correlates of depression among school children in Amritsar reported high levels of depression in female students.\textsuperscript{18} Another

| Study Variable                          | Unadjusted OR (95% CI) | p-value | Adjusted OR (95% CI) | p-value |
|-----------------------------------------|------------------------|---------|----------------------|---------|
| **Age Categories**                      |                        |         |                      |         |
| 15-17 Years                             |                        |         |                      |         |
| 18-19 Years                             | 1.13(0.75 – 1.70)      | 0.537   | 0.72(0.44 – 1.20)    | 0.219   |
| **Gender**                              |                        |         |                      |         |
| Male                                    | Reference              |         |                      |         |
| Female                                  | 2.08(1.33 – 3.25)      | 0.001   | 2.05(1.18 – 3.56)    | 0.010   |
| **Type of School**                      |                        |         |                      |         |
| Government                              | Reference              |         |                      |         |
| Private                                 | 0.56(0.37 – 0.84)      | 0.006   | 0.39(0.21 – 0.69)    | 0.002   |
| **Father Profession**                   |                        |         |                      |         |
| Govt. Employee                          | Reference              |         |                      |         |
| Pvt. Employee                           | 1.07(0.61 – 1.87)      | 0.804   | 0.88(0.44 – 1.74)    | 0.727   |
| Businessman                             | 1.53(0.83 – 2.82)      | 0.169   | 1.66(0.78 – 3.54)    | 0.186   |
| Unemployed                              | 1.03(0.36 – 2.93)      | 0.954   | 0.84(0.23 – 3.01)    | 0.796   |
| **Mother Profession**                   |                        |         |                      |         |
| Employed                                | Reference              |         |                      |         |
| House Wife                              | 0.27(0.10 – 0.68)      | 0.006   | 0.28(0.09 – 0.83)    | 0.022   |
| **Student Grading**                     |                        |         |                      |         |
| Excellent                               | Reference              |         |                      |         |
| Good                                    | 1.29(0.79 – 2.12)      | 0.302   | 1.07(0.60 – 1.90)    | 0.811   |
| Satisfactory                            | 1.54(0.81 – 2.91)      | 0.183   | 2.10(0.96 – 4.61)    | 0.063   |
| Unsatisfactory                          | 6.87(0.79 – 59.52)     | 0.080   | 5.00(0.38 – 64.96)   | 0.219   |
| Don’t Know                              | 2.29(0.53 – 9.75)      | 0.261   | 1.82(0.31 – 10.56)   | 0.504   |
| **Father Suffered from Anxiety/Depression** |                    |         |                      |         |
| No                                      | Reference              |         |                      |         |
| Yes                                     | 3.99(2.09 – 7.64)      | 0.000   | 3.02(1.39 – 6.59)    | 0.005   |
| **Mother Suffered from Anxiety/Depression** |                    |         |                      |         |
| No                                      | Reference              |         |                      |         |
| Yes                                     | 3.51(1.98 – 6.22)      | 0.000   | 3.12(1.52 – 6.41)    | 0.002   |
Research conducted in Iran showed significant correlation of family history of psychiatric disorder with prevalence of depression in their children. This finding was same as our study, where there was significant association of family history of depression in either parent with prevalence of depression in participants after adjustment with other confounders. This finding can be justified by available literature of clinical psychology which reports that family history of depression is a predictor or risk factor of depression.

**Limitations of the study:** This include cross-sectional nature of study hence temporal relationship could not be established; plus the study selected schools on the basis of convenience due to lack of sufficient resources and time limitation. The other limitation was that the study used self-administered data collection methods which could have caused participant’s bias.

**CONCLUSION**

The study reported high prevalence of anxiety and depression among adolescents. The study found that being a female student of public sector school and those who had a family history of depression were more likely to develop anxiety and depression. We recommend placing a certified counselor in high schools for proper guidance of students of this age group. Additionally those students who report with anxiety and depression symptoms must be referred for proper diagnosis and treatment with information readily available on local resources for help if needed.

**Acknowledgement:** Authors wish to acknowledge the principals of selected schools for granting permission and all students who participated in our study.

**Conflict of Interest:** None.

**Funding:** None.

**REFERENCES**

1. Moeini B, Bashirian S, Soltanian AR, Ghaleiha A, Taheri M. Prevalence of depression and its associated sociodemographic factors among Iranian female adolescents in secondary schools. BMC Psychol. 2019;7(1):25. doi: 10.1186/s40359-019-0298-8
2. Alharbi R, Alsuhaibani K, Almarshad A, Alyahya A. Depression and anxiety among high school student at Qassim Region. J Family Med Prim Care. 2019;8(2):504-510. doi: 10.4103/jfmpc.jfmpc_383_18
3. Kaya M, Genc M, Kaya B, Pehlivan E. Prevalence of depressive symptoms, ways of coping, and related factors among medical school and health services higher education students. Turkish J Psychiat. 2007;18(2):137-146.
4. Murray CJL, Lopez AD, World Health O, World B, Harvard School of Public H. The Global burden of disease : a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020 / edited by Christopher J. L. Murray, Alan D. Lopez. Boston: Harvard School of Public Health; 1996. Available from: https://digitallibrary.un.org/record/195454?ln=en

5. Beusenberg M, Orley JH, World Health Organization. Division of Mental H. A User’s guide to the self reporting questionnaire (SRQ / compiled by M. Beusenberg J Orley Geneva: World Health Organization; 1994. Available from: https://apps.who.int/iris/handle/10665/10665/61113

6. World Health O. Depression and other common mental disorders: global health estimates. Geneva: World Health Organization; 2017. Report No.: Contract No.: WHO/MSD/MER/2017.2. Available from: https://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017-2-eng.pdf

7. Ahmed BS, Enam S, Iqbal Z, Mazrata G, Bashir S, editors. Depression and anxiety: A snapshot of the situation in Pakistan 2016. Available from: https://ecommonsaku.edu.pk/pakistan_fhs_mc_mc/135/ (Last seen: July 30, 2021).

8. Ganatra HA, Zafar SN, Qidwai W, Rozi S. Prevalence and predictors of depression among an elderly population of Pakistan. Aging Ment Health. 2008;12(3):349-356. doi: 10.1080/13607860702121068

9. Syed EU, Hussein SA, Mahmud S. Screening for emotional and behavioural problems amongst 5-11-year-old school children in Karachi, Pakistan. Soc Psychiatry Psychiatr Epidemiol. 2007;42(5):421-427. doi: 10.1007/s00127-007-0188-x

10. Hamdani SU, Huma Z-e-, Javed H, Warraitch A, Rahman A, Nizami AT, et al. Prevalence of psychosocial distress in school going adolescents in rural Pakistan: findings from a cross-sectional epidemiological survey. BJPsych Open. Cambridge University Press; 2021;7(S1):S56-S57. doi: 10.1192/bjo.2021.196

11. Lamis DA, Malone PS, Jahn DR. Alcohol Use and Suicide Proneness in College Students: A Proposed Model. Ment Health Subst Use. 2014;7(1):59-72. doi: 10.1080/17552528.2013.781535

12. Pham T, Bui L, Nguyen A, Nguyen B, Tran P, Vu P, Dang L. The prevalence of depression and associated risk factors among medical students: An untold story in Vietnam. PLoS One. 2019;14(8):e0221432. doi: 10.1371/journal.pone.0221432

13. Platt R, Williams SR, Ginsburg GS. Stressful Life Events and Child Anxiety: Examining Parent and Child Mediators. Child Psychiatry Hum Dev. 2016;47(1):23-34. doi: 10.1007/s10578-015-0540-4

14. January J, Madhombiro M, Chipamaunga S, Ray S, Chingono A, Abas M. Prevalence of depression and anxiety among undergraduate university students in low- and middle-income countries: a systematic review protocol. Syst Rev. 2018;7(1):57. doi: 10.1186/s13643-018-0723-8

15. Sandal R, Goel N, Sharma M, Bakshi R, Singh N, Kumar D. Prevalence of depression, anxiety and stress among school going adolescent in Chandigarh. J Fam Med Prim Care. 2017;6(2):405-410. doi: 10.4103/2249-4863.219988

16. Ali BS, Reza H, Khan MM, Jehan I. Development of an indigenous screening instrument in Pakistan: the Aga Khan University Anxiety and Depression Scale. J Pak Med Assoc. 1998;48(9):261-265.

17. Jha KK, Singh SK, Nirla SK, Kumar C, Kumar P, Aggarwal N. Prevalence of Depression among School-going Adolescents in an Urban Area of Bihar, India. Indian J Psychol Med. 2017;39(3):287-292. doi: 10.4103/0255-7176.207326

18. Kaur S, Deepi S, Lal M. Prevalence and correlates of depression among college going students of district Amritsar, India. Int Res J Med Sci. 2014;2(11):5-9.

19. Lodha RS PS, Maata S, Negi P, Sahu N, Pal DK, Murari VK. Prevalence of Depression amongst Higher Secondary School Adolescents in Bhopal Madhya Pradesh. Ntl J Community Med. 2016;7(11):856-858.

20. Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. J Pak Med Assoc. 2006;56(12):583-586.

21. Alvi T, Assad F, Ramzan M, Khan FA. Depression, anxiety and their associated factors among medical students. J Coll Physicians Surg Pak. 2010;20(2):122-126.

22. Rehmani N, Khan QA, Fatima SS. Stress, Anxiety and Depression in students of a private medical school in Karachi, Pakistan. Pak J Med Sci. 2018;34(3):696-701. doi: 10.12669/pjms.343.14664

23. Daryanavard A, Madani A, Mahmoudi M, Rahimi S, Nourooziyan F, Hosseinpoor M. Prevalence of Depression among High School Students and its Relation to Family Structure. Am J Appl Sci. 2011;8:39-44. doi: 10.3844/ajassp.2011.39.44

24. Sadock BJaVAs. Kaplan and Sadock’s Pocket Handbook of Clinical Psychiatry. 5th ed. New York: Lippincott Williams and Wilkins; 2010.

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Pak J Med Sci     March - April 2022 (Part-II)     Vol. 38   No. 4      www.pjms.org.pk     921