Analysis of Adolescent Depression Risk Factors During the Third Year of COVID-19 Pandemic in Surabaya

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Abstract

Background: The COVID-19 pandemic has caused changes such as isolation and contact restrictions. Adolescents are vulnerable to these changes because social contact is very important for their development. Research is needed on risk factors for adolescent mental health disorders especially depression during a pandemic to help deal with psychological conditions during and after an outbreak.

Objective: To analyse the relationship between risk factors and adolescent depression during the third year of COVID-19 pandemic in Surabaya.

Methods: This study used an observational analytic cross-sectional study design with an accidental sampling technique. The sample population is students of a junior high school in Surabaya grade 7 and 8. Depression is the dependent variable measured using the DASS-42 score using only the depression item. The independent variables consist of risk factors which are measured using a questionnaire. Statistical data were analysed using the Chi-square test.

Result: Total respondents in this study is 121 students. A total of 22.3% students experienced depression. There was a correlation between gender (p=0.009), family history of COVID-19 infection (p=0.041), and parental education (p=0.055) on depression in adolescents.

Conclusion: Gender, family history of COVID-19 infection, and parental education have a relationship with depression in adolescents during the COVID-19 pandemic in Surabaya.

Keywords: *COVID-19; depression; adolescent; risk factor; psychological wellbeing*

1. Introduction

Corona Virus Disease 2019 – COVID-19 – has become a pandemic and affected various parts of the world (Adhikari et al., 2020). The first case of COVID-19 in Indonesia was identified in Depok City, on March 2 2020, while in Surabaya City, the first case was found on March 17 2020. Since then, COVID-19 cases in Surabaya have continued to increase and eventually made Surabaya the city with the highest number of deaths from COVID-19 in Indonesia in 2020.

In the third year of the COVID-19 pandemic, 2022, the World Health Organization (WHO) stated that the pandemic was not over and there was the possibility of new variants appearing (WHO, 2022). There are various changes during a pandemic such as social changes that cause stress and disrupt daily life, which can affect mental health in the general population (Penninx et al., 2022). The implementation of quarantine will

further increase the pressure because quarantine is becoming an unpleasant experience for those who go through it. Separation from loved ones, loss of independence, uncertainty about disease status, and boredom can sometimes have a negative effect (Brooks et al., 2020). Adolescents are especially vulnerable to these changes because social contact is very important for their development (Fegert et al., 2020).

Adolescence is a period of transition from childhood to adulthood in which a person will experience significant changes in many areas of their life, including biological function, cognitive abilities, social environment, as well as family and peer relationships (Bailen et al., 2018). The World Health Organization (WHO) states that adolescents are a group of people with an age range of 10-19 years. “Millennials” and “Gen Z” will be the dominant workforce groups in the future. Understanding their health and well-being is very important because it will determine the future of the world (Liu et al., 2020).

Depression is a serious disorder that has a negative impact on a person's feelings, thoughts and actions. A person with depression may have decreased interest and pleasure in daily activities, significant weight loss or gain, insomnia or oversleeping, a lack of energy, an inability to concentrate, feelings of worthlessness or excessive guilt, and recurrent thoughts about death or suicide (APA, 2021). In a large-scale cross-sectional epidemiological study conducted among adolescents aged 12-18 years in China, March 2020, the prevalence of depressive symptoms in middle and high school students was 43.7% (Zhou et al., 2020).

Another study says that adolescents in China have a higher incidence of depressive symptoms compared to adults (Wang et al., 2020). A meta-analysis study stated that depressive status in adolescents worsened significantly in the post-COVID-19 period (Wang et al., 2022). The CDC released new data from the results of the Adolescent Behaviors and Experiences Survey (ABES) conducted in the first half of 2021, that more than 1 out of 3 high school students in America experienced poor mental health during the pandemic and nearly half of students felt continuously sad or hopeless (CDC, 2022).

With the statistics that has been presented, it can be seen that social support, initial psychological assistance, and psychiatric assistance are needed for people who feel depressed during this pandemic (Marques de Miranda et al., 2020). Therefore, it is important for clinical psychology to look more broadly at strategies and practices in correcting or preventing significant psychological distress to address the mental health needs of the entire population (Gruber et al., 2021).

In an attempt to reduce the incidence of depression in adolescents, it is necessary to understand what factors influence the occurrence of depression itself. This study aims to analyze the relationship between several risk factors and depression in adolescents during the third year of COVID-19 pandemic especially in Surabaya. The risk factors that we analyzed were gender, personal history of COVID-19 infection, family history of COVID-19 infection, parental basic income, and parental education. Thus, it is hoped that the results of this study can increase understanding of the relationship between risk factors and depression in adolescents during the third year of COVID-19 pandemic, especially for health practitioners, social workers, and the community.

2. Methods

2.1 Study design and site

This study is an observational analytic study with a cross-sectional approach. Data collection was carried out at a junior high school in Surabaya on June 15 2022.

2.2 Sampling and study subject

This study used an accidental sampling technique with a total sample of 121 students. The samples included in this study were grade 7 and 8 students who were willing to take part in the study and fill out the questionnaire completely.

2.3 DASS questionnaire

The depression level was measured using the DASS questionnaire. The Depression Anxiety Stress Scale (DASS) was developed by Lovibond, S.H and Lovibond, P.F in 1995. The DASS questionnaire is a self-report questionnaire designed to measure the severity of negative emotional states of depression, anxiety, and stress. This questionnaire consists of 42 items to measure three scales, namely depression, anxiety, and stress, each scale consisting of 14 question items (Gale, 2015). This study only uses items that specifically measure the depression scale, namely items 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42.

The validity and reliability of the DASS questionnaire has been tested and applied internationally. According to Crawford and Henry (2003), DASS is a reliable measurement tool with a value of 0.897 and is valid for the constructs intended to be assessed. This instrument has been translated into Bahasa Indonesia and tested for reliability and validity by Damanik (2006), it was stated that this questionnaire was reliable (α = 0.948) and 41 items were found to be valid.

2.4 Data collection and analysis

The data in this study were obtained through an electronic questionnaire consisting of demographic data, risk factors, and the DASS depression item questionnaire. The questionnaire was distributed directly to the respondents and was equipped with a filling guide. The dependent variable used was depression, while the independent variables were risk factors including gender, personal history of COVID-19 infection, family history of COVID-19 infection, parental basic income, and parental education. Data were analyzed using Microsoft Excel 2016 and SPSS 22. Statistical analysis was performed using the Chi-square test. The final result then presented in form of tables.

3. Result

3.1 Subject characteristic

Based on **Table 1**, there are more female (52.1%) in this study compared to male (47,9%) and were dominated by grade 8 students (64.5%). The majority of students and family members have never been infected with COVID-19. The majority of parents have a salary below the regional minimum wage (55,4%). The educational history of the parents was almost the same, namely 49.6% had parents with higher education and 50.4% had parents with less education.

Table 1. Subject characteristics

Characteristics	Total (n = 121)	Percentage (%)
Gender		
Male	58	47,9

Female	63	52,1
Class		
Grade 7	43	35,5
Grade 8	78	64,5
Personal history of COVID-19 infection		
Yes	22	18,2
No	99	81,8
Family history of COVID-19 infection		
Yes	51	42,1
No	70	57,9
Parental basic income		
Below the regional minimum wage	67	55,4
Above the regional minimum wage	54	44,6
Parental education		
Lower education	60	49,6
Higher education	61	50,4

3.2 Depression level

The subject's level of depression was obtained through the results of completing the DASS questionnaire item 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, and 42. The majority of students did not show symptoms of depression (77,7%). The rest (22,3%) showed depressive symptoms with different levels according to the explanation on **Table 2**.

Table 2. Depression level

Depression level	Total (n = 121)	Percentage (%)
Normal (score of 0-9)	94	77,7
Mild (score of 10-13)	9	7,4
Moderate (score of 14-20)	11	9,1
Severe (score of 21-27)	4	3,3
Extremely severe (score of ⩾28)	3	2,5

3.3 Analysis of the relationship between risk factors and depression

Analysis of the relationship between risk factors and depression was carried out using the Chi-Square test. The depression variable was categorized into 2 nominals, namely showing no evidence of depression for subjects with a score of 0 – 9 and showing evidence of depression for subjects with a score of 10 – ⩾28. Based on **Table 3**, the risk factors that have a significant relationship to depression are gender, family history of COVID-19 infection, and parental education (p value < 0,05).

Table 3. Correlation between risk factors and depression

	Depressive state				p value
	Not depressed		Depressed		
Characteristics	n	%	n	%	
Gender					
Male	51	87,9	7	12,1	0,009
Female	43	68,3	20	31,7	
Personal history of COVID-19 infection					
Yes	18	81,8	4	18,2	0,780
No	76	76,8	23	23,2	
Family history of COVID-19 infection					
Yes	35	68,6	16	31,4	0,041
No	59	84,3	11	15,7	
Parental basic income					
Below the regional minimum wage	51	76,1	16	23,9	0,645
Above the regional minimum wage	43	79,6	11	20,4	
Parental education					
Lower education	51	85	9	15	0,055
Higher education	43	70,5	18	29,5	
Total	94	77,7	27	22,3	

4. Discussion

4.1 Gender

In this study, there was a significant relationship between gender and the onset of depressive symptoms in adolescents during the third year COVID-19 pandemic (p = 0,009). The same result was also revealed by another study in China which stated that female adolescents showed a higher risk of depression during the COVID-19 pandemic (Zhou et al., 2020; Chen et al., 2020). Halldorsdottir et al. (2021) in their research found an increase in depressive symptoms among girls during the pandemic but not boys.

This difference may be due to girls reporting lower life satisfaction and more conflicts with their parents during the COVID-19 pandemic compared to boys (Kapetanovic et al., 2021; Magson et al., 2020). The increased prevalence of depression also correlates with the hormonal changes that occur in girls, especially during puberty (Albert, 2015). Symptoms of depression in teenage girls are also different from teenage boys. Adolescent girls with depression tend to feel sad, guilty, worthless, and low morale, while boys with depression have symptoms such as irritability, suicidal thoughts, or a desire to do less of what they enjoy (Shokrgozar et al., 2017).

4.2 Personal history of COVID-19 infection

A history of COVID-19 infection should be considered as a risk factor for mental disorders among adolescents (Marques de Miranda et al., 2020). In this study, personal history of being infected with COVID-19 did not have a significant relationship with the occurrence of depressive symptoms in adolescents during the third year COVID-19 pandemic (p = 0,780). To date, no research has discussed the relationship between a history of COVID-19 infection in adolescents and their level of depression.

Easy access to find information related to COVID-19 is believed to be one of the factors for the low level of mental health disorders in adolescents. Individuals with higher knowledge scores related to COVID-19 tend not to show symptoms of anxiety, depression, and PTSD (Zhou et al., 2020). Marques de Miranda et al. (2020) also stated that being optimistic about the COVID-19 pandemic resulted in a lower depression score.

4.3 Family history of COVID-19 infection

In this study, a family history of being infected with COVID-19 has a significant relationship with depressive symptoms in adolescents during the third year COVID-19 pandemic (p = 0,041). Until now, there has been no research discussing the relationship between a family history of being infected with COVID-19 and the level of depression in adolescents. The fear of contracting COVID-19 is believed to be a risk factor for depression in adolescents. Adolescents with a high risk of exposure to COVID-19 have significantly higher levels of depressive symptoms than those who do not have this risk (Qu et al., 2022).

In addition, worries about family members who will die from COVID-19 infection can also play a role in the onset of depression. According to Nearchou et al. (2020), fear related to COVID-19 associated with negative emotional reactivity can predict the onset of depression in adolescents. The spike in the number of positive cases and confirmed deaths has made some adolescents become overly concerned about the pain that will be experienced by themselves and their families caused by exposure to the virus (Duan et al., 2020). Meanwhile, having a family member who has died from COVID-19 is also believed to trigger depression in adolescents. Adolescents who do not have a parent figure in their daily lives are more likely to experience depression during the COVID-19 pandemic (Chen et al., 2020).

4.4 Parental basic income

The pandemic may have had a greater impact on adolescents who come from families with lower socioeconomic conditions (Marques de Miranda et al., 2020). However, in this study, parental income did not have a significant effect on the occurrence of depressive symptoms in adolescents during the third year COVID-19 pandemic (p = 0,645). Other studies state different results, namely that a group of Italian children and youth who are socioeconomically disadvantaged are more prone to depressive symptoms when they lack essential supplies during a pandemic (Serra et al., 2022).

One of these differences can be caused by the lack of understanding of the respondents in this study regarding their parents' basic income so that the answers to the questionnaire are inaccurate. Respondents in this study were students in grades 7 and 8, it is possible that they still do not understand the exact amount of each parent's basic income.

4.5 Parental education

In this study, parental education had a significant relationship with the onset of depressive symptoms in adolescents during the third year COVID-19 pandemic (p = 0,055). The same result was also expressed by Chen

et al. (2020) that lower parental education is associated with an increased risk of depression in children during the COVID-19 pandemic. Parents with higher education tend to provide better support to their children. Good support has been shown to increase adolescent self-esteem, social welfare, and reduce depressive symptoms among adolescents, while low parental support has been shown to be associated with greater psychological distress and psychological complaints (Ramberg, 2021).

Another study stated that more depressive symptoms were found in adolescents with bad parent-child relationships compared to those who had good or normal relationships during the pandemic (Wang et al., 2021). The poor style of interaction between parents and children, such as parents being very critical, often making comparisons, can be a potential stressor for adolescents, especially when they will often meet their parents at home during quarantine due to COVID-19 (Wang et al., 2021).

5. Conclusion

This study found that the risk factors associated with depression in adolescents during the third year of COVID-19 pandemic in Surabaya were gender, family history of COVID-19 infection, and parental education. Schools should consider providing mental support related to psychological conditions in adolescents by carrying out routine checks, especially during a pandemic that has a lot of pressure.

Acknowledgements

The authors would like to express their gratitude to the Faculty of Medicine, Universitas Airlangga also academic community and students from the junior high school where the study took place for supporting and allowing this study to be completed.

References

Adhikari, S., Meng, S., Wu, Y., Mao, Y., Ye, R., Wang, Q., Sun, C., Sylvia, S., Rozelle, S., Raat, H. and Zhou, H., 2020, 'Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review', *Infectious Diseases of Poverty*, vol 9, issue 1, p 29.

Albert, P.R., 2015, 'Why is depression more prevalent in women?', *Journal of Psychiatry and Neuroscience*, vol 40, issue 4, p 219.

American Psychiatric Association, 2021, What is Depression? Retrieved: July 3, 2021, from https://www.psychiatry.org/patients-families/depression/what-is-depression.

Bailen, N., Green, L. and Thompson, R., 2018, 'Understanding Emotion in Adolescents: A Review of Emotional Frequency, Intensity, Instability, and Clarity', *Emotion Review*, vol 11, issue 1, p 63.

Brooks, S., Webster, R., Smith, L., Woodland, L., Wessely, S., Greenberg, N. and Rubin, G., 2020, 'The Psychological Impact of Quarantine and How to Reduce it: Rapid Review of The Evidence', *The Lancet*, vol 395, issue 10227, pp 915-916.

Centers for Disease Control and Prevention, 2022, Adolescent Behaviors and Experiences Survey (ABES), Retrieved: September 24, 2022, from https://www.cdc.gov/healthyyouth/data/abes.htm.

Chen, F., Zheng, D., Liu, J., Gong, Y., Guan, Z. and Lou, D., 2020, 'Depression and anxiety among adolescents during COVID-19: A cross-sectional study.', *Brain, Behavior, and Immunity*, vol 88, pp 36-38.

Crawford, J. and Henry, J., 2003, 'The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample', *British Journal of Clinical Psychology*, vol 42, issue 2, pp 111-131.

Damanik, D.E., 2006, Pengujian reliabilitas, validitas, analisis item dan pembuatan norma Depression Anxiety Stress Scale (DASS): Berdasarkan penelitian pada kelompok sampel Yogyakarta dan Bantul yang mengalami gempa bumi dan kelompok sampel Jakarta dan sekitarnya yang tidak mengalami gempa bumi, Retrieved: June 16, 2021, from http://www.lontar.ui.ac.id/file?file=pdf/abstrak-94859.pdf.

Duan, L., Shao, X., Wang, Y., Huang, Y., Miao, J., Yang, X. and Zhu, G., 2020, 'An investigation of mental health status of children and adolescents in China during the outbreak of COVID-19', *Journal of Affective Disorders*, vol 275, pp 112-118.

Fegert, J., Vitiello, B., Plener, P. and Clemens, V., 2020, 'Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality', *Child and Adolescent Psychiatry and Mental Health*, vol 14, issue 1, p 20.

Gale, L., 2015, Anxiety and Depression Assessment: Using the Depression Anxiety Stress Scales, Retrieved: June 17, 2021, from https://www.ebscohost.com/assets-sample-content/Anxiety_and_Depression_Assessment_SWPS.pdf.

Gruber, J., Prinstein, M., Clark, L., Rottenberg, J., Abramowitz, J., Albano, A., Aldao, A., Borelli, J., Chung, T., Davila, J., Forbes, E., Gee, D., Hall, G., Hallion, L., Hinshaw, S., Hofmann, S., Hollon, S., Joormann, J., Kazdin, A., Klein, D., La Greca, A., Levenson, R., MacDonald, A., McKay, D., McLaughlin, K., Mendle, J., Miller, A., Neblett, E., Nock, M., Olatunji, B., Persons, J., Rozek, D., Schleider, J., Slavich, G., Teachman, B., Vine, V. and Weinstock, L., 2021, 'Mental health and clinical psychological science in the time of COVID-19: Challenges, opportunities, and a call to action', *American Psychologist*, vol 76, issue 3, pp 409-426.

Halldorsdottir, T., Thorisdottir, I., Meyers, C., Asgeirsdottir, B., Kristjansson, A., Valdimarsdottir, H., Allegrante, J. and Sigfusdottir, I., 2021, 'Adolescent well-being amid the COVID-19 pandemic: Are girls struggling more than boys?', *Journal of Child Psychology and Psychiatry Advances*, vol 1, issue 2, pp 8-9.

Kapetanovic, S., Gurdal, S., Ander, B. and Sorbring, E., 2021, 'Reported Changes in Adolescent Psychosocial Functioning during the COVID-19 Outbreak', *Adolescents*, vol 1, issue 1, pp 10-20.

Liu, C., Zhang, E., Wong, G., Hyun, S. and Hahm, H., 2020, 'Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: Clinical implications for U.S. young adult mental health', *Psychiatry Research*, vol 290, p 113172.

Magson, N., Freeman, J., Rapee, R., Richardson, C., Oar, E. and Fardouly, J., 2020, 'Risk and Protective Factors for Prospective Changes in Adolescent Mental Health during the COVID-19 Pandemic', *Journal of Youth and Adolescence*, vol 50, issue 1, pp 44-57.

Marques de Miranda, D., da Silva Athanasio, B., Sena Oliveira, A. and Simoes-e-Silva, A., 2020, 'How is COVID-19 pandemic impacting mental health of children and adolescents?', *International Journal of Disaster Risk Reduction*, vol 51, p 101845.

Nearchou, F., Flinn, C., Niland, R., Subramaniam, S. and Hennessy, E., 2020, 'Exploring the Impact of COVID-19 on Mental Health Outcomes in Children and Adolescents: A Systematic Review', *International Journal of Environmental Research and Public Health*, vol 17, issue 22, p 8479.

Penninx, B.W.J.H., Benros, M.E., Klein, R.S. *et al.,* 2022, "How COVID-19 shaped mental health: From infection to pandemic effects", *Nature Medicine*, vol 28, issue 10, pp 2027–2037.

Qu, M., Yang, K., Cao, Y., Xiu, M. and Zhang, X., 2022, 'Mental health status of adolescents after family confinement during the COVID-19 outbreak in the general population: a longitudinal survey', *European Archives of Psychiatry and Clinical Neuroscience*, p 8.

Ramberg, J., 2021, 'The Association between Parental Support and Adolescents' Psychological Complaints: The Mediating Role of a Good School Climate', *Children*, vol 8, issue 7, p 550.

Serra, M., Presicci, A., Quaranta, L., Urbano, M., Marzulli, L., Matera, E., Margari, F. and Margari, L., 2022, 'Depressive risk among Italian socioeconomically disadvantaged children and adolescents during COVID-19 pandemic: a cross-sectional online survey', *Italian Journal of Pediatrics*, vol 48, issue 1.

Shokrgozar, S., Khesht-Masjedi, M., Abdollahi, E., Golshahi, M. and Sharif-Ghaziani, Z., 2017, 'Comparing depressive symptoms in teenage boys and girls', *Journal of Family Medicine and Primary Care*, vol 6, issue 4, p 775.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. and Ho, R., 2020, 'Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China', *International Journal of Environmental Research and Public Health*, vol 17, issue 5, p 1729.

Wang, J., Wang, H., Lin, H., Richards, M., Yang, S., Liang, H., Chen, X. and Fu, C., 2021, 'Study problems and depressive symptoms in adolescents during the COVID-19 outbreak: poor parent-child relationship as a vulnerability', *Globalization and Health*, vol 17, issue 1, pp 1-9.

Wang, S. *et al.*, 2022, 'Depression and anxiety among children and adolescents pre and post covid-19: A comparative meta-analysis', *Frontiers in Psychiatry*, vol 13, pp 1-10.

World Health Organization, 2022, Who director-general's opening remarks at the UNGA UNSG-hosted event: "ending the pandemic through equitable access to covid-19 vaccines, tests and treatments" – 23 september 2022, Retrieved: October 30, 2022, from https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-unga-unsg-hosted-event---ending-the-pandemic-through-equitable-access-to-covid-19-vaccines--tests-and-treatments----23-september-2022.

Zhou, S., Zhang, L., Wang, L., Guo, Z., Wang, J., Chen, J., Liu, M., Chen, X. and Chen, J., 2020, 'Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19', *European Child & Adolescent Psychiatry*, vol 29, issue 6, pp 749-758