



Impact of Family Income on Mental health changes of Korean Adolescents in COVID 19

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Abstract: The coronavirus disease of 2019 (COVID-19) had an adverse impact on socioeconomics and poor mental health in adolescents. However, mental health changes due to family economic impacts are limited in the nursing-based literature. This study aimed to investigate the association between economic impact and mental health changes in Korean adolescents. Data were from the Korean Youth Panel Survey 2021; a total of 54,848 adolescents were included. The study variables were sociodemographic, mental health and behavior. Mental health problems included depression, anxiety, sadness, suicidal ideation, and hopelessness. Multivariate logistic regression was performed to find the association between economic impact and mental health problems and was reported by odds ratios (ORs) and 95% confidence intervals (CI). Overall, nearly half of the adolescents (44.7%) had mental health changes, and most of them were girls (51.7%). The COVID-19-related economic impact was more likely to have a mental health change (OR, 2.12; 95% CI, 1.38–3.25) in the middle-income group (OR, 1.32; 95% CI, 1.19–1.44) and statistically significant ($p < 0.05$) compared to the no economic impact. The results confirm an association between sudden economic impact due to COVID-19 and mental health problems in Korean adolescents. To preserve adolescents' health, professionals must focus on population-based mental health promotion in clinical and community strategies that should be included in child health interventions and school health programs for emerging infectious diseases in the near future.

1. Introduction

Globally, the coronavirus disease (Covid 2019) has resulted in over 6.7 million deaths and over 700 million confirmed cases [1]. Since the COVID-19 outbreak in 2019 and 2020, the pandemic has contributed to the economic crisis to some extent, even if the facts do not allow for a causal relationship or direct association between economic decline and COVID-19 [2]. Korea did not impose lockdown but adopted a policy of social distancing to correspond with the quarantined period as employment and economic status declined.

Numerous studies have examined the impact of the COVID-19 pandemic on mental health [3–4]. Common mental health issues that people experience during COVID-19 include depression, anxiety, sleeplessness, acute stress, or post-traumatic stress disorder (PTSD), and suicidal ideas and behaviors [5–7]. Economic challenges, such as unfavorable financial events, put a strain on parents and interfere with their parenting, which hurts their children's mental health, according to the

family stress model, which is commonly used to explain family-level pathways [8]. Adolescents from families with low socio-economic status are less likely to receive psychosocial services and support from their family, educational, or peer contexts [9–10].

Adolescence is a transitional period into adulthood. It is a crucial time for identity development, and they may also experience several lifestyle changes and be vulnerable to social influences during this process [11]. Adolescents' mental health problems can negatively impact their lives until adulthood by impairing daily functioning, including academic performance [12]. The COVID-19 pandemic has affected children and adolescents' mental and general well-being in addition to their physical health, including perceived threats, stress, and coping [13, 14]. Literature studies on the association with COVID-19 and children's and adolescents' mental health revealed that anxiety, depression, and anxiety were higher after the pandemic than before [15–17]. The relationship between COVID-19 and the mental health of



adolescents has been the focus of previous research; however, few studies have used a nationally representative sample that includes adolescents from various countries [13, 16, 18, 19]. Nevertheless, it is still unknown how the financial burden of the pandemic control efforts contributes to mental health problems.

The purpose of this study was to determine the relationship between family economic impact and mental health changes in Korean adolescents using the Korea Youth Risk Behavior Survey, 2021, owing to restrictions and household income during the COVID-19 pandemic.

2. Materials and methods

Data source and population

This study used data from the Korea Youth Risk Behavior Web-based Survey (KYRBS) conducted in 2021. The KYRBS is a nationally representative survey and is conducted annually to understand the status of the health behaviors of adolescents [20]. The questionnaires of the survey are focused on the health status and health behaviors of adolescents and include potential health risk

issues such as smoking, drinking, physical activity, eating habits, obesity, mental health, sexual behavior, internet and mobile use, drugs, and mental health. Furthermore, international organizations such as the WHO have utilized this data to compare adolescent health conditions across different countries.

A total of 54,848 adolescents participated in this survey, and all of them were included in this study. Data were collected using a unique anonymous participant number, and anonymity and confidentiality were maintained throughout data collection. Consent was obtained from all participants at the time of data collection.

Measures

This study focused on adolescents who self-perceived any mental health change as a dependent variable, including depression, anxiety, and suicidal ideation. The mental health changes were screened by the relevant questions and responses were coded accordingly (Table 1).

Table 1. Mental health problems and code

Mental health Problems /Questions	Responses
Depression Have you experienced feelings of sadness or hopelessness to the extent that they interfered with your daily life for a period of 2 weeks or past 12 months?	Yes or No
Suicide Have you ever thought of committing suicide in the past 12 months?	
Loneliness How often have you felt lonely in the past 12 months?	No [1. I did not feel lonely at all, 2 I almost never felt lonely, 3. I sometimes felt lonely] Yes [4. I often felt lonely, and 5. I always felt lonely]
Stress What level of stress do you often experience?	No [1. I do not feel it at all, 2. I do not feel it much, 3. I feel it a little]. Yes [4. I feel it a lot, and 5. I feel it very much].

Economic impact/Family income

An economic impact due to COVID-19 was evaluated by asking the question, "Do you think the COVID-19 outbreak has caused your family's economic status to get worse?" The choices for responses were "very likely," "somewhat likely," "not too likely," and "not likely at all." These answers have been classified into two categories: "yes" and "no." The perceived household

economic status was assessed by the question "What is the economic status of your family?" with the following responses: high, middle, and low.

Covariates

The selected demographic variables were age, sex, residence, living with parents, self-reported academic achievement, and perceived health status. The residence



area was di-vided into metropolitan, urban, and rural; living with parents was yes and others (dormitory, child welfare center, with relatives, or by yourself). Self-reported Academic achievement was categorized into high, middle, and low. The behaviors were smoking habits, alcohol consumption, sleeping patterns, and physical activity and were categorized as yes or no, respectively.

Data analysis

To depict nationally representative samples, complex sample weights were employed. Descriptive statistics were utilized to determine the demographic characteristics and economic impact of COVID-19. Chi-square analyses were performed to evaluate differences within groups. Logistic regression was analyzed to find the association between economic impact and any mental health changes in adolescents and reported odds ratios (ORs) and 95% confidence intervals (CI). Further, multiple logistic regression analysis was performed by

adjusting selected covariates to examine the relationship between COVID-19-related economic impact with household income and any mental health changes in adolescents. All the statistical analyses were carried out using SAS v9.4 (SAS Institute Inc.; Cary, North Carolina). Statistical significance was set at $P < 0.05$.

3. Results and discussion

This study included 54,848 adolescents; of these, 28,530 (52.0%) had an economic impact due to COVID-19. More than half of the participants (54.8%) and girls (51.7%) showed having mental health problems. Most of them were aged 14 (17.1%), followed by seventeen and eighteen years of living with parents (82.1%), and their self-reported academic achievement was medium (36.5%). In terms of behavior changes, adolescents with any mental health showed smoking (10.8%), alcohol use (18.9%), lack of sleep (53.1%), and irregular physical activity (53.3%), statistically significant at the $p < 0.05$ level (table 2).

Table 2. Sociodemographic characteristics of the adolescents with and without mental health problems

Variables	Any mental health chnages						p	
	Total		Yes		No			
	N	(%)	N	(%)	N	(%)		
Total		54848	100	24510	44.7	30,338	55.3	
COVID-19-related economic impact	Yes	28,530	52.0	13,456	54.9	15,074	49.7	
	No	26,318	48.0	11,054	45.1	15,264	50.3	
Sex	Boys	28,153	51.3	11,842	48.3	16,311	53.8	
	Girls	26,695	48.7	12,668	51.7	14,027	46.2	
Age (Years)	12	2482	4.5	1251	5.1	1231	4.1	<.001
	13	10,074	18.4	3451	14.1	6623	21.8	
	14	10,193	18.6	4201	17.1	5992	19.8	
	15	9385	17.1	3715	15.2	5670	18.7	
	16	8460	15.4	3862	15.8	4598	15.2	
	17	8555	15.6	4120	16.8	4435	14.6	
	18	5699	10.4	3910	16.0	1789	5.9	
Residential area	Metropolitan	21,821	39.8	9832	40.1	11,989	39.5	0.221
	Urban	28,381	51.7	12525	51.1	15,856	52.3	
	Rural	4646	8.5	2153	8.8	2493	8.2	
Household economic status	High	21,528	39.3	9196	37.5	12,332	40.6	<.001
	Middle	27,077	49.4	11622	47.4	15,455	50.9	
	Low	6243	11.4	3692	15.1	2551	8.4	



Variables	Any mental health changes						p	
	Total		Yes		No			
	N	(%)	N	(%)	N	(%)		
Living with parents							0.411	
	Yes	50,220	91.6	20121	82.1	30,099	99.2	
	other*	4628	8.4	4389	17.9	239	0.8	
Self-reported Academic achievement								<.001
	High	18,930	34.5	9251	37.7	9679	31.9	
	Middle	20,517	37.4	8946	36.5	11,571	38.1	
	Low	15,401	28.1	6313	25.8	9088	30.0	
Perceived health status								<.001
	Good	38,444	70.1	11956	48.8	26,488	87.3	
	Bad	16,404	29.9	12554	51.2	3850	12.7	
Smoking status								<.001
	Yes	3842	7.0	2650	10.8	1192	3.9	
	No	51,006	93.0	21860	89.2	29,146	96.1	
Alcoholic consumption								<.001
	Yes	6410	11.7	4626	18.9	1784	5.9	
	No	48,438	88.3	19,884	81.1	28,554	94.1	
Perceived sleeping pattern								<.001
	Good	29,750	54.2	11,485	46.9	18,265	60.2	
	Not good	25098	45.8	13,025	53.1	12,073	39.8	
Stress								<.001
	Yes	26,214	47.8	14,656	59.8	11,558	38.1	
	No	28,634	52.2	9854	40.2	18,780	61.9	
Physical activity								<.001
	Regular	28,451	51.9	11,441	46.7	17,010	56.1	
	Irregular	26,397	48.1	13,069	53.3	13,328	43.9	

Table 3 reports the results of the multiple logistic regression analysis, which confirmed that COVID-19-related economic impact was significantly associated (aOR = 2.12, 95% CI: 1.38–3.25) with increased odds of any mental health problems. Adolescents with middle household income were more likely to experience mental health changes (aOR = 1.32, 95% CI: 1.19–1.44) than other comparative groups and were statistically significant at $p < 0.05$. In addition, girls (OR = 1.88, 95% CI: 1.10–2.51) from a medium level of economic status showed a higher likelihood of getting mental health problems than boys (Figure 1).

3. Association between socio-economic impact on COVID-19 and adolescents with mental health

Variables	Mental health problems			p
	aOR**	95% CI		
COVID-19-related Economic impact				
No	1.00			
Yes	2.12	1.38	3.25	0.004
Household economic status				
High	1.00			
Middle	1.32	1.19	1.44	<0.001
Low	0.95	0.84	1.10	0.191



**adjusted the analyses for sex, age, residence, living with parents, academic achievement, perceived health status, smoking, physical activity and alcoholic consumption.
aOR = adjusted odds ratio, CI = confidence interval.

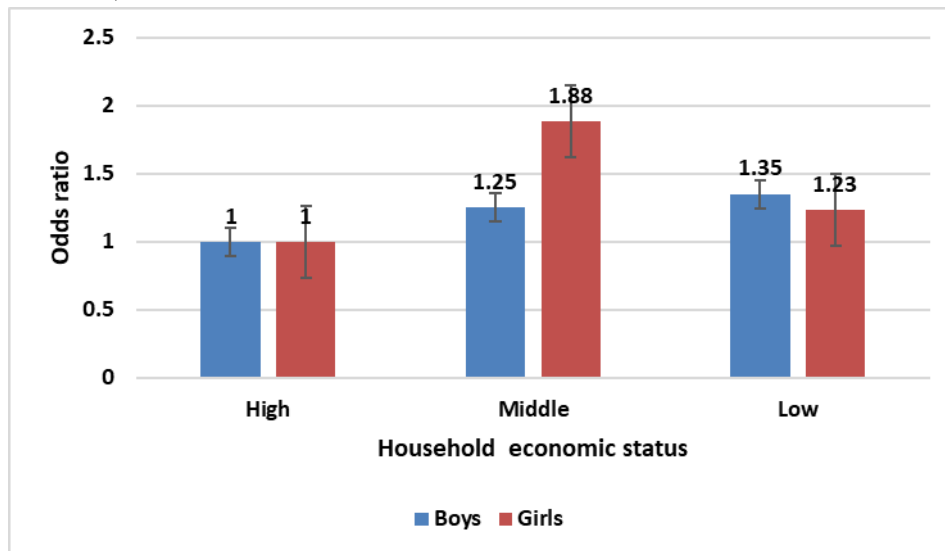


Figure 1. Gender based association between household economic status and mental health problems in adolescents.

Discussion

This study investigated the relationships between the financial impacts of COVID-19 and changes in Korean adolescents' mental health. In addition, adolescents in senior high school had the greatest depression and anxiety symptoms [21]. Further stated that during the COVID-19 pandemic, psychological well-being is significantly impacted by low self-health status and sleep-related symptoms, including dizziness [18, 21, 22]. Our findings showed that the COVID-19-related economic impact was more likely associated with any mental health changes in adolescents. The same results found in a prior study found a relationship between poor mental health and low household economic status and representative data from Korean teenage populations [14, 23–25] and other countries [18, 19, 21, 22]. In contrast, the COVID-19 epidemic may be negatively affecting teenage mental health, according to earlier research [16, 12]. Prior studies have shown that underemployment and job recession are related to poor mental health, and they affect their families and children [25–28]. There is a need for further interpersonal dispute intervention and the recognition of preventive components that reduce the association between the economic impact of COVID-19 and the poor mental health of adolescents in the future. We found that most of the adolescents had any mental health changes during COVID 19. Studies have shown

that changes in lifestyle, such as physical distance, quarantine, isolation, fear of infection, and the closing of schools, are linked to anxiety and depression in children and teenagers. Also, girls and urban residents were more likely to experience any mental changes than boys, and results showed that female adolescents had considerably higher rates of sadness [15, 28]. There's a chance that people living in cities are more anxious than those in rural regions because the outbreak started in a densely populated area, and many more deaths have occurred there since [13, 17]. Numerous studies have found substantial differences in anxiety levels between both genders [16, 19, 26]. The COVID-19 pandemic may have contributed to irregular physical activity among adolescents, as evidenced by the fact that the frequency of physical activity declined dramatically due to social distance and restrictions [25, 29]. In order to have a conversation about social support that will meet the health and financial requirements of families, our study highlights the necessity for governments to provide care for teenagers who are susceptible to both disease and financial hardship during the COVID-19 epidemic. There is still uncertainty in the work market due to the COVID-19 pandemic's prolonged outbreak. Additionally, while many nations throughout the world have implemented income loss compensation plans, these initiatives place a stronger emphasis on economic



problems than health-related ones. The ongoing global emerging disease has highlighted the importance of paying attention to children's and adolescents' mental health, indicating that prompt action is now necessary after COVID-19. Although there is evidence that the COVID-19 pandemic has not just affected this particular group, this analysis highlights the need for age-specific coping strategies to address the special requirements of children and adolescents.

Due to their limited coping methods and poor comprehension of the pandemic, researchers have suggested that children and adolescents may be more sensitive to the biopsychosocial stressors brought about by the pandemic. In adolescents and children, COVID-19 is predicted to cause a wide range of mental health issues and exacerbate pre-existing conditions. Teenagers' mental health during and after the pandemic deserves special attention since they are particularly susceptible to pressure during developmentally sensitive periods. Untreated mental health issues in children can have long-term detrimental effects on their health and social development.

There were some limitations to our study. First, this was a cross-sectional study; findings about COVID-19's causality cannot be stated. Second, it was not possible to determine COVID-19-related economic impact and mental health problems due to non-validated data from the family's ideal income-based measurements. Third, our analysis did not include all the existing school-based measurements; therefore, we can't find their potential psychosocial activities.

Conclusions

This study examined the mental health changes and COVID-19 economic impact on Korean adolescents. Overall, we focused on all the mental health problems, including anxiety, depression, suicide ideation, loneliness, and sadness, and the factors that influence them. The results of this study provide valuable information to parents, teachers, and healthcare professionals for the development of psychological interventions, in addition to serving as a reminder to researchers and government officials that they should be more concerned about the mental health of adolescents, who are frequently overlooked following an outbreak because of their relatively lower morbidity and mortality than older adults. It is necessary to improve adolescents'

healthcare access by utilizing both in-person and online resources. More virtual mental health initiatives are required to reduce the serious COVID-19-related mental health crises in adolescents during and after the current crisis.

Author contributions

VR conceptualized the study, cleaned the data, performed the analyses, wrote the initial draft, and led the writing of the final draft. JK wrote the first draft and interpreted the results. VR and JK substantially contributed to the interpretation of results and writing of the final draft. All authors have read and approved the final manuscript.

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Ethics statement

Ethical approval was not required for the study and human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants.

Informed Consent Statement

Not applicable.

Data Availability Statement

The datasets used in this study are available from the corresponding author upon request. The KYRBS data can be accessed and downloaded from the KDCA website (<https://www.kdca.go.kr/yhs/home.jsp>).

Conflicts of Interest

The authors declare no conflict of interest.

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