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ORIGINAL ARTICLE

GENDER, REGION, AND BACKGROUND-RELATED FACTORS INFLUENCING ADOLESCENT DISEASE-PREVENTION BEHAVIOR DURING THE COVID-19 PANDEMIC IN INDONESIA

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ABSTRACT

Raising awareness about disease prevention behavior in adolescents is an effective measure for reducing the transmission of COVID-19. This study aimed to examine adolescent disease-prevention behavior during the COVID-19 pandemic in Indonesia and identify its associations with gender, region, and background-related factors. This was a cross-sectional study that involved 492 respondents between the ages of 12 to 18 years and currently attending junior high school or senior high school. The Mann–Whitney *U* test and Kruskal–Wallis *H* test was used. The findings indicated that the mean age of the respondents was 15.77 (SD = 1.42), the majority of the respondents were girls (76.4%), and most were living in Eastern Indonesia (81.5%). Girls placed a significantly higher effort for prevention than boys for self-precaution, social distancing, and following coughing and sneezing etiquette, with mean (SD) values of 21.48 (SD = 2.79), 20.40 (SD = 2.89), and 17.73 (SD = 2.44), respectively. Gender and region also had significant correlations with reported self-protection, social distancing, and self-immunity enhancement behavior ($p< 0.05$). It can be concluded that COVID-19-prevention measures practiced by adolescents differ according to gender, region, education level, both parents' education level, and the father's occupation.

Keywords: Adolescents; COVID-19; factors; preventive behavior

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INTRODUCTION

The first case of coronavirus disease 2019 (COVID-19) was detected in Indonesia on March 02, 2020. By July 2020, Indonesia has the third-highest number of confirmed cases in Southeast Asia, standing at 74,018 cases, along with 3,535 deaths (Dezan Shira & Associates, 2020). Previous studies have also reported a higher COVID-19 incidence in adolescents and adults than in children (Cavalcante Pinto Júnior et al., 2021), a higher incidence in adolescents than in adults (Rumain et al., 2021), and similar seroprevalence in adolescents and adults (Viner et al., 2021). Furthermore, the mortality rate of COVID-19 was found to be higher in patients aged ≥ 10 years who were categorized with severe symptoms upon admission to a tertiary referral hospital in Indonesia (Dewi et al., 2021).

Adolescents have a higher risk of contracting the coronavirus infection if they are in an immune-compromised state, malnourished, have medical comorbidities, or have poor hygiene (Kar et al., 2020). COVID-19 can be transmitted to others by emitting liquid particles such as aerosols and droplets from the nose or mouth when the infected individual coughs, sneezes, or speaks (WHO, n.d.). The key factor in mitigating the spread of the disease is compliance with infection control protocols. Previous research suggests that young adults may exhibit low compliance with COVID-19 transmission control (Barari et al., 2020).

Those between the ages of 10 and 24 have a higher potential to spread the virus due to their need for social interaction, peer acceptance, and susceptibility to peer influence (Andrews et al., 2020). Moreover, young people tend to look healthy even though they are infected because they have an innate immune system response that allows their bodies to swiftly react to pathogens (Mallapaty, 2021)

The Indonesian government issued a policy on May 28, 2020, that the country would adopt a *new normal* as a transition mechanism to encourage a return to normal economic and social activities (Muhyiddin, 2020). However, the implementation of this policy without encoding it into law has led to new problems such as violations of COVID-19 prevention norms and public disobedience (Mokodongan et al., 2021).
Research indicated that adolescents had lower compliance with the government's anti-virus rules due to low trust (Nivette et al., 2020). Therefore, it is vital to increase awareness and promote positive behavior to change these adolescents' health practices (Dardas et al., 2020).

Prevention efforts against COVID-19 are widely applied in various regions in Indonesia. Cultural diversity in each region has an important role in the efforts taken to deal with the outbreak (Ayuningtyas et al., 2020). A study stated that among the people of Central Java, there are social phenomena related to public disobedience in implementing health protocols due to cultural transformations resulting from the adaptation of the new normal (Widisuseno & Sudarsih, 2021).

The most effective preventive behaviors against COVID-19 are physical distancing, avoiding touching the eyes, nose, and mouth, wearing a medical mask, and coughing or sneezing into a bent elbow or tissue (WHO, 2020b). A previous study from South Korea reported that wearing a mask was the most common preventive behavior among adolescents and social distancing was the lowest (Park & Oh, 2021). Moreover, evidence from Ethiopia revealed that older adolescents practiced more preventive measures than younger adolescents. These measures include improving the body's immunity, paying attention to the disease, restricting movement, sensitization to actions in the community, and substance use toward the outbreak of COVID-19 (Feyisa, 2021). However, existing research has not explained in detail the relationship between the components of preventive behavior and other related factors.

Furthermore, different countries also have different cultures and community habits. Research on preventive behavior in adolescents is important as their development requires socialization with peers and has the potential to spread COVID-19. Therefore, this study aims to examine the disease prevention behavior of adolescents during the COVID-19 pandemic and identify its association with gender, region, and background-related factors in adolescents.

METHOD

Study design

This is a quantitative research that used a descriptive survey method with a cross-sectional approach. Descriptive research was used as it aims to determine the prevalence of an event (Dahlan, 2018). This study was conducted using an online research platform.

Sample

The sample in this study was 492 teenagers who were selected by the convenience sampling technique. The inclusion criteria in this study included being 12–18 years of age or currently attending junior high school or senior high school, using a smartphone, having at least one social media application (e.g., WhatsApp, Instagram, Facebook, or Telegram), and able to use Google Forms. The exclusion criterion was respondents who did not submit the questionnaire.

Data collection

Data were collected via an online questionnaire that was distributed between October 14 to November 09, 2020. The study was conducted in the Eastern (Sulawesi, Bali, Nusa Tenggara, Maluku) and Western regions of Indonesia (Java, Sumatra, Kalimantan).

Instrument

The questionnaire was made using Google Forms and sent to the respondents through social media. The 19-item instrument consists of four types of questions that measure preventive behavior, i.e., self-disease prevention behavior, immunity enhancement, social distancing, and following coughing and sneezing etiquette. These behaviors were recommended in the COVID-19 prevention and control protocol published by the Ministry of Health, as part of the Directorate General of Disease Prevention and Control in Indonesia.

For the questionnaire, the Likert scale ranging from 1 to 5 (never to always) was used. A validity test on the 19 questions was performed using the Pearson Product Moment correlation. An r count value of one and r count > r table was also obtained, and this supports the validity of the instrument. A Cronbach's alpha value of 0.757 was also obtained, showing it to have good reliability.

Data analysis

The data were analyzed by calculating the frequency distributions of the respondent's characteristics and reported COVID-19-prevention behavior. Non-parametric statistical tests were used to assess the relationship between any two variables. The Mann–Whitney *U* test was used to examine the differences in the reported disease prevention behavior of adolescents with different characteristics, where the dependent variable was ordinal, and the independent variable comprised two categorical groups. The observations were not normally distributed. The Kruskal–Wallis *H* test was also used to evaluate group differences in instances where there were more than two independent groups. All groups had the same distribution. The results were judged as significant if the *p-value* < 0.05.

Ethical consideration

This research was approved by the Ethics Committee of the Hasanuddin University Faculty of Medicine with the ethical number: 499/UN4.6.4.5.31/PP36/2020.

RESULTS

The respondents' ages ranged from 12 to 18 with a mean (SD) of 15.77 (1.42). The total number of respondents was 492. A majority of the participants (453 respondents) obtained COVID-19 information from social media (92.1%) and 401 respondents resided in East Indonesia (81.5%). The majority had parents with a junior or senior high school education: 251 (51%) fathers and 270 (54.9%) mothers. As for parental occupation, 370 respondents (75.2%) had employed fathers and 335 respondents (68.1%) had mothers who were homemakers (Table 1).

Table 1. Respondents' characteristics and parental background (n = 492)

Characteristic	n (%)	Mean (SD)
Characteristics of respondents		
Age		15.77 (1.41)
Gender		
Boys	116 (23.6)	
Girls	376 (76.4)	
Grade		
Junior high school	214 (43.5)	
Senior high school	278 (56.5)	
Source of COVID-19 information	453(92.1)	
Media (print/electronic/social)	39 (7.9)	
Family/friends/health provider		
Region*		
East Indonesia	401(81.5)	
West Indonesia	91 (18.5)	
Parental characteristics		
Father's Education		
University	172(35.0)	
Junior/senior high school	251(51.0)	
Elementary school	69 (14.0)	
Mother's Education		
University	161 (32.7)	
Junior/senior high school	270 (54.9)	
Elementary school	61 (12.4)	
Father's occupation		
Government/private employee	370 (75.2)	
Farmer/laborer/fisherman	104 (21.1)	
Died	18 (3.7)	
Mother's occupation		
Working	157 (31.9)	
Housewife	335 (68.1)	

Abbreviation: COVID-19, Coronavirus Disease 2019; SD, Standard Deviation

**The research location during the measurement for East Indonesia consisted of Sulawesi, Bali, Nusa Tenggara, and Maluku, and West Indonesia consisted of Java, Sumatera, and Kalimantan*

The mean values for the four components of adolescent disease prevention behavior were compared. Self-protection had the highest mean (SD) score of 21.18 (3.08%), with a 95% CI of 20.91–21.45, followed by social distancing (20.19 [3.08], 95% CI: 19.91–20.46), immunity enhancement (19.59 [2.71], 95% CI: 19.35–19.83), and following coughing and sneezing etiquette (17.60 [2.65], 95% CI: 17.37–17.84) (Table 2).

Table 2. Adolescent disease-prevention behavior during the COVID-19 pandemic

Behavioral Components	Mean (SD)	95% Confidence Interval
Self-protection	21.18 (3.07)	20.91-21.45
Immunity enhancement	19.59 (2.71)	19.35-19.83
Social distancing	20.19 (3.08)	19.91-20.46
Application of coughing and sneezing etiquette	17.60 (2.65)	17.37-17.84

Abbreviation: COVID-19, Coronavirus Disease 2019; SD, Standard Deviation

The data was analyzed by evaluating the relationship between individual characteristics and adolescent preventive behavior in response to COVID-19. Significant associations were found between gender, region, and three of the components of COVID-19-disease prevention behavior, i.e., self-protection, social distancing, and self-immunity enhancement (*P-value* <0.05). Furthermore, the respondents' education level had a significant correlation with immunity enhancement (*P*-value = 0.002). Regarding parental background, the father's education level was found to be associated with social distancing and the father's occupation was associated with self-protection and social distancing. However, the source of COVID-19 information and the mother's occupation did not have statistically significant relationships with the adolescents' disease prevention behavior (Table 3).

Table 3. The association between characteristics and adolescent disease-prevention behavior during the COVID-19 pandemic (n = 492)

Variable	Self-protection		Immunity enhancement		Social distancing		Application of coughing and sneezing etiquette	
	Mean (SD)	*P-value*	Mean (SD)	*P-value*	Mean (SD)	*P-value*	Mean (SD)	*P-value*
Gender[a]		0.001*		0.001*		0.019*		0.254
Boys	20.22(3.67)		20.28(2.75)		19.51(3.53)		17.18(3.22)	
Girls	21.48(2.79)		19.38(2.66)		20.40(2.89)		17.73(2.44)	
Education grade[a]		0.572		0.002*		0.772		0.877
Junior high school	3.07(.21)		20.00(2.75)		20.21(3.25)		17.65(2.52)	
Senior high school	3.07(.18)		19.27(2.64)		20.17(3.12)		17.56(2.76)	
Source of COVID-19 information[a]		0.716		0.557		0.211		0.250
Media (print/electronic/social)	21.25(3.12)		19.52(2.57)		20.59(2.77)		17.87(2.73)	
Family/friends/health provider	21.81(2.18)		19.90(2.34)		20.97(2.49)		17.39(2.16)	
Father's education[b]		0.134		0.368		0.031*		0.438
University	21.41(2.92)		19.68(2.66)		20.52(3.07)		17.41(2.76)	
Junior/senior high school	21.23(3.03)		19.65(2.58)		20.18(3.02)		17.72(2.54)	
Elementary school	20.43(3.47)		19.16(3.20)		19.36(3.19)		17.65(2.78)	
Mother's education[b]								
University	21.40(2.76)	0.508	19.80(2.52)	0.096	20.60(3.09)	0.022*	17.63(2.65)	0.570
Junior/senior high school	21.11(3.26)		19.61(2.75)		20.09(3.11)		17.50(2.75)	
Elementary school	20.89(2.93)		18.92(2.93)		19.49(2.80)		17.97(2.19)	
Father's occupation[b]		0.009*		0.212		0.027*		0.340
Government/private employee	21.35(3.09)		19.72(2.67)		20.38(3.09)		17.68(2.63)	
Farmer/laborer/fisherman	20.51(2.94)		19.13(2.89)		19.62(3.01)		17.26(2.79)	
Died	21.56(2.92)		19.67(2.09)		19.56(2.85)		18.00(2.25)	
Mother's occupation[a]		0.801		0.065		0.107		0.551
Employee	21.17(3.01)		19.90(2.55)		20.46(3.15)		17.55(2.60)	
Housewife	21.19(3.09)		19.44(2.77)		20.06(3.04)		17.63(2.68)	
Region[a]		0.03*		0.03*		0.022*		0.184
East Indonesia	21.03(3.13)		19.46(2.76)		20.01(3.16)		17.50(2.76)	
West Indonesia	21.84(2.69)		20.18(2.35)		20.96(2.58)		18.04(2.09)	

Abbreviation: COVID-19, Coronavirus Disease 2019; SD, Standard Deviation
[a] Evaluated using Mann–Whitney U test
[b] Evaluated using Kruskal–Wallis H test
**Considered significant value P <0.05*

DISCUSSION

This study found that the most commonly practiced disease prevention behavior done by adolescents during the COVID-19 outbreak was self-protection. We defined self-protection as maintaining hand hygiene by using an alcohol-based hand sanitizer or soap and water, wearing a medical mask, and avoiding touching one's eyes, nose, and mouth. Our finding is supported by a global study that showed an improvement in personal protective measures such as hand washing, mask-wearing, and reducing face-touching behavior during the COVID-19 pandemic (Machida et al., 2020) (Chen et al., 2020).

Following coughing and sneezing protocols such as covering the nose and mouth with disposable tissue, or the inside of the elbow were less commonly practiced in our sample. Previous research has shown the potential of coughs and sneezes to spread respiratory viral infections, as they generate approximately 3,000 and 40,000 airborne droplets, respectively (Dhand & Li, 2020).

Gender was found to have a significant correlation with self-protection, social distancing, and enhancement of COVID-19-immunity. It was found that girls were more likely than boys to protect themselves against the spread of COVID-19 and avoid physical contact with others. This is consistent with previous studies which stated that the majority of female secondary school students adopted better behavior and had a higher level of knowledge on hand hygiene and personal protection than their male counterparts (Guzek et al., 2020). This also includes mask-wearing and physical distancing during the pandemic (Ningsih et al., 2021). Nevertheless, in our study, boys reported more behaviors that increase the body's immune response compared to girls. Previous literature has found that the immune response to the coronavirus differs between sexes, with males having weaker immune responses (i.e., antibodies and T-cells) to infection than females (Gadi et al., 2020) (Takahashi et al., 2020).

Furthermore, there were differences in behavior between those residing in different regions. Respondents from western Indonesia had the highest mean score for performing disease prevention behavior and reported significantly more self-protection, social distancing, and self-immunity behaviors than those residing elsewhere (P <0.05). This result contrasts a previous study that found no relationship between regions in Indonesia and attitudes toward COVID-19 (Muslih et al., 2021). Our research was conducted in October 2020, when the western Indonesian provinces of DKI Jakarta, East Java, West Java, and Central Java had the highest numbers of confirmed cases; those of DKI Jakarta, East Kalimantan, South Kalimantan, and East Java had the highest mortality rates (WHO, 2020a). Another study reported an association between regional COVID-19 morbidity and routine adolescent hand-washing, such as before and after meals, before and after using the restroom, and after handshaking (Skolmowska et al., 2020).

A relationship was also observed between parental education and social distancing practices. On average, teenagers of parents with a university-graduate educational level or equivalent, applied more social distancing. This result contrasts with the findings of a previous study that stated that parental education had no significant association with adolescent social distancing. This research is supported by Astuti et al., (2022) that the parental education has a significant influence on preventing the spread of COVID-19 in children. Whereas city lockdowns, parental rules, and social responsibility were associated with greater social distancing. The results of our study may be caused by a majority of educated parents helping their adolescent children to structure their time to balance physical activity and sedentary behaviors (Muñoz-Galiano et al., 2020). Parental support and attention to location and activity types may help to control their children's physical activity during the pandemic (Yomoda & Kurita, 2021). Moreover, the frequency of parent-adolescent conversations about COVID-19 has been found to influence adolescents' adherence to COVID-19 health disease prevention behaviors over the first year of the pandemic (Peplak et al., 2021).

The limitation of this study is that the data were collected via an online questionnaire, so the possibility of bias may occur as some of the target populations are not represented. However, several previous studies have been conducted with the same because direct sampling through surveys in communities or schools is not possible due to social distancing (Riiser et al., 2020) (Bazaid et al., 2020) (Meier et al., 2020).

CONCLUSION

This study found that self-protection was the most commonly reported disease prevention behavior in adolescents during the pandemic in Indonesia. The COVID-19-prevention measures practiced by adolescents differ according to gender, region, as well as the parent's education level and occupation. Hence, we suggest that interventions to increase disease prevention behavior should be targeted at boys and that action by parents is needed to limit the physical activities of adolescents, which would in turn limit the spread of COVID-19.

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