



Healthy Lifestyle Behaviour Changes During the Covid-19 Pandemic in Youth and Adult Groups in Indonesia

Fillah Fithra Dieny*^{1,2}, Firdananda Fikri Jauharany¹, A. Fahmy Arif Tsani^{1,2} Choirun Nissa^{1,2}

¹Departemen of Nutrition Science, Faculty of Medicine, Universitas Diponegoro

²Center of Nutrition Research (CENURE), Faculty of Medicine, Universitas Diponegoro

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ABSTRACT

The Covid-19 pandemic has changed various kinds of human behavior, especially behavior related to health. Health institutions have issued protocols to prevent the virus so that it affects people's lifestyles a lot. This study aims to analyze changes in people's behavior, especially healthy lifestyles before and during the Covid-19 pandemic in Indonesia. A cross-sectional study which involved 563 subjects. The inclusion criteria are that the subject lives in Indonesia, aged 12-55 years, is willing to take part in the research and fill out an online questionnaire. The independent variable is the time that is divided into before and during the Covid-19 pandemic. The dependent variable is healthy lifestyle behavior which includes hand washing habits, exercise habits, weight checking habits, sunbathing habits and smoking habits. The analysis includes univariate analysis, normality test and bivariate analysis using the Wilcoxon test to analyze differences in healthy lifestyle behavior before and during the Covid-19 pandemic. The results showed that 425 subjects (75.5%) were female, and > 50% of subjects had a bachelor's level education and above. Most of the subjects live in urban areas (69.1%), come from the island of Java (86.0%), have daily activities not related to health (58.1%) and carry out government recommendations, namely stay at home (76.4%). There were differences in hand washing frequency ($p < 0.001$), exercise frequency ($p = 0.037$), sunbathing frequency ($p < 0.001$), and sunbathing duration ($p < 0.001$) between before the pandemic compared to during the Covid-19 pandemic. However, there was no change in smoking habits based on the number of cigarettes before and during the Covid-19 pandemic. The conclusion of the research that during the Covid-19 pandemic, public awareness to have a clean and healthy lifestyle, namely increasing the frequency of washing hands, doing sports and sunbathing.

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Kata kunci:

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*) *corresponding author*

Fillah Fithra Dieny, SGz, MSi

Department of Nutrition Science, Faculty of
Medicine, Universitas Diponegoro
Address: Jl. Prof. Sudarto No.13, Tembalang,
Kec. Tembalang, Kota Semarang, Jawa
Tengah 50275

ABSTRAK

Pandemi Covid-19 telah merubah berbagai macam perilaku manusia, khususnya perilaku yang terkait dengan kesehatan. Lembaga kesehatan telah mengeluarkan protokol pencegahan virus tersebut sehingga banyak mempengaruhi gaya hidup masyarakat. Penelitian ini bertujuan untuk menganalisis perubahan perilaku masyarakat khususnya perilaku gaya hidup sehat (healthy lifestyle) sebelum dan saat terjadi pandemi Covid-19 di Indonesia. Penelitian dengan design cross-sectional yang dilakukan pada 563 subjek. Kriteria inklusi adalah subjek tinggal di Indonesia, berusia 12-55 tahun, bersedia mengikuti penelitian dan mengisi kuesioner secara online. Variabel bebas adalah waktu yang dibedakan menjadi sebelum dan saat pandemic Covid-19. Variabel terikat perilaku gaya hidup sehat (healthy lifestyle) yang meliputi kebiasaan cuci tangan dengan sabun, kebiasaan olahraga kebiasaan pengecekan berat badan, kebiasaan berjemur dan

Email: fillahdieny@gmail.com

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kebiasaan merokok. Analisis meliputi analisis univariat, uji kenormalan dan analisis bivariat menggunakan uji Wilcoxon untuk menganalisis perbedaan perilaku healthy lifestyle sebelum dan selama pandemi Covid-19. Hasil penelitian menunjukkan bahwa sebanyak 425 subjek (75,5%) berjenis kelamin perempuan, dan > 50% subjek memiliki tingkat pendidikan sarjana dan di atasnya. Sebagian besar subjek tinggal di perkotaan (69,1%), berasal dari pulau Jawa (86,0%), aktifitas sehari-hari tidak berhubungan dengan kesehatan (58,1%) dan melakukan anjuran pemerintah yaitu stay at home (76,4%). Ada perbedaan frekuensi cuci tangan ($p < 0,001$), frekuensi olahraga ($p = 0,037$), frekuensi berjemur ($p < 0,001$), dan durasi berjemur ($p < 0,001$) antara sebelum pandemi dibandingkan dengan selama pandemi Covid-19. Namun tidak ada perubahan pada kebiasaan merokok berdasarkan jumlah batang rokok sebelum dan selama pandemi Covid-19. Simpulan dari penelitian ini adalah masa pandemi Covid-19 meningkatkan kesadaran masyarakat untuk berperilaku hidup bersih dan sehat yaitu meningkatnya frekuensi cuci tangan dengan sabun, melakukan olahraga dan berjemur.

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INTRODUCTION

The Coronavirus pandemic 2019-2020 or known as the COVID-19 pandemic, is an incident when the Coronavirus disease spreads around the world. The disease caused by a new strain of coronavirus called SARS-CoV-2. (Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020) The first COVID-19 outbreak was detected in Wuhan City, Hubei Province, China in December 2019, and was announced as a pandemic by the World Health Organization (WHO) on March 11th, 2020. (World Health Organization, 2020c)

The SARS-CoV-2 virus is presumed to be transmitted by respiratory droplets through coughing. (CDC, 2020; European Centre for Disease Prevention and Control, 2020; World Health Organization, 2020c) These droplets can also be produced by sneezing and normal breathing. Moreover, the virus can be spread by touching contaminated surfaces followed by touching face gestures. (World Health Organization, 2020c) The COVID-19 is most contagious when the infected people have symptoms, although the transmission may occur before the symptoms appear. (CDC, 2020) Symptoms usually appear after five days after being exposed to the virus; however, in some other cases, the symptoms appear in 2 -14 days. The most clinical signs and symptoms are fever, having difficulty breathing, with large pneumonia infiltrate in both lungs as confirmed by X-rays.

Indonesian society responded to this global outbreak with various reaction. Some responded to this situation seriously, but some responded with jokes and satires. Until on March 2nd 2020, President of the Republic of Indonesia, Joko Widodo stated that two Indonesians were tested positive for COVID-19. Various policies have been issued by the government to break the chain of virus transmission, especially in Indonesia. Issuing the self-isolation regulation by not allowing people to go outside, except for urgent matters, has indirectly affected the activity of the society: they have limited working space and minimum mobility. (World Health Organization (WHO), 2020)

The outbreak may lead the society to anxiety and fear, which triggers behaviour changes to prevent the impact or limit the risk of the virus exposure. (Kerr, 2004) When the WHO announced COVID-19 as a pandemic, and this deadly virus has infected two Indonesians, the fear became even more real. People started thinking that this deadly virus

could infect them at any time. In this phase, they started to worry as "the threat is in sight".

The COVID-19 pandemic has indirectly changed various kind of human behaviours, especially related to health. Ministries and other health organisations have issued protocols or advice to prevent virus transmission that have greatly affected a person's behaviours in terms of lifestyle. (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2020; Kementerian Kesehatan RI, n.d.) Nowadays, people have realised that maintaining a clean and healthy lifestyle is essential. People have started to adopt the lifestyle, both in rural and urban areas. Washing both hands before and after doing a certain activity is a form of a healthy lifestyle. Another good practice is that many people have practised a proper cough etiquette in public for the sake of mutual comfort and safety. (Zhou et al., 2020)

These behaviours were not seen before the pandemic, where health promotion regarding healthy living behaviours and GERMAS (Healthy Living Community Movement) which was regularly promoted were just slogans. Nevertheless, many have questioned if the pandemic can change a person's behaviours related to health, considering that in developing countries like Indonesia, there are still many people who do not have a high educational background, low awareness, low socio-economy and limited access to information. Besides, the work from home (WFH) policy can be an excuse for someone to be less active. Based on this background, the authors are interested in analysing behaviour changes, especially in healthy lifestyle changes before and during the COVID-19 pandemic in Indonesia.

METHOD

This study is within the scope of community nutrition. The study design was cross-sectional. The research was conducted in Indonesia from May to July 2020, with adolescents and adults as study participants. An online survey was used as a data collection instrument. This study has obtained ethical clearance from the Medical / Health Research Bioethics Commission, Faculty of Medicine, Islamic Universitas Sultan Agung Semarang with number 295/IX/2020/Komisi Bioetik

The study population was people residing in Indonesia who were in their productive age. The inclusion criteria were

12-55 years old, not on a particular diet, willing to participate, cooperative and communicative, owning and being active in using a mobile phone. The number of subjects was calculated using a sample size formula in one population with a dropout consideration of 20%—the selection of subjects using a total sampling method. In total, the number of participants in this study was 563 subjects.

The independent variable in this study was the time before and during the COVID-19 pandemic. The dependent variable was behaviours related to a healthy lifestyle: frequency of washing hands in a day, frequency of exercise in a week, frequency of checking body weight in a month, frequency of sunbathing in a week, duration of sunbathing in a day, and the number of cigarette consumption a day. All dependent variables were measured using a questionnaire developed based on conditions and articles related to the COVID-19 pandemic, which had been tested for validity and reliability. The questionnaire was distributed through social media, such as Facebook, WhatsApp and Line. All subjects agreed to their participation by filling out an online informed consent that was attached to the questionnaire.

We performed univariate analysis to describe the characteristics of the participants, such as gender, education level, occupation, type of residence, area of residence, and income. The data normality test was carried out before performing a bivariate analysis using the Wilcoxon test to determine differences in lifestyle before and during the COVID-19 pandemic with $\alpha = 0.05$.

RESULTS AND DISCUSSION

A total of 563 study participants, 24.5% were male, and 75.5% were female. The education level of study participants was various, ranging from junior high school to doctoral degree with the highest percentage being undergraduate degree (42.6%). Most of the participants (86%) resided in Java, and the rests (14%) were spread across Sumatera, Kalimantan, Sulawesi, Bali and Nusa Tenggara.

Most of the study participants (69,1%, n=389) lived in urban areas, while another 30,7% (n=174) lived in rural area. The participant's education level was mainly undergraduate (42,6%, n= 240). Whilst the income level of study participants were mainly in < Rp 1.000.000 range, while another 27,9% (n=157) in > Rp 1.000.000 – Rp 3.000.000 range.

Table 1.
Characteristics of Study Participants

Categories	n	%
Gender		
Male	138	24,5
Female	425	75,5
Education Level		
Junior High School	2	0,4
Senior High School	152	27,0
Diploma	43	7,6
Undergraduate	240	42,6
Graduate (Master' s/Doctoral)	126	22,3
Occupation		
Students	190	33,7
Civil servant	119	21,1
Entrepreneur	25	4,4
Private employee	171	30,4
Unemployed	58	10,3
Type of Residence		
Private house	482	85,6
Rented room	46	8,2
Rented house	31	5,5
Apartment	4	0,7
Area of Residence		
Urban area	389	69,1
Rural area	174	30,7
Location of Residence		
Java	484	86,0
Sumatera	31	5,5
Kalimantan	25	4,4
Sulawesi	15	2,7
Bali dan Nusa Tenggara	8	1,4
Income		
< Rp.1000.000,-	157	27,9
> Rp.1000.000,- sd Rp.3.000.000,-	157	27,9
> Rp.3.000.000,- sd Rp.5000.000,-	109	19,4
> Rp.5.000.000,- sd Rp.10.000.000,-	107	19
> Rp.10.000.000 ,-	33	5,9
Behaviours related to a healthy lifestyle		
Yes	236	41,9
No	327	58,1
Stay at home		
Yes	430	76,4
No	133	23,6

Table 2.
Mean, Minimum, and Maximum Value of Participant's Healthy Lifestyle

Variable	Before Pandemic			During Pandemic		
	Mean	Min	Max	Mean	Min	Max
Frequency of handwashing with soap (times/day)	5,56	0	20	10,26	0	50
Frequency of exercising (times/week)	1,38	0	7	1,53	0	7
Frequency of body weight monitoring (times/month)	1,76	0	4	1,72	0	4
Frequency of sunbathing (times/week)	0,67	0	4	1,68	0	4
Sunbathing Duration (minutes/day)	5,69	0	45	12,67	0	45
Total cigarettes consumption (sticks/day)	0,56	0	24	0,47	0	24

The mean frequency of participant's handwashing practice in this study increased from 5,56 times/day before pandemic to 10,26 times/day during the pandemic. This increase also occurred in the frequency of exercising from 1,38 times/week to 1,53 times/week, sunbathing from 0,67 times/week to 1,68 times/week and sunbathing duration from 5,69 minutes/day to 12,67 minutes/day. On the other

hand, in this study, we found that the number of cigarettes consumption was decreased from 0,56 sticks/day to 0,47 sticks/day. A decrease in the mean frequency of body weight monitoring was also found in this study between before and during the COVID-19 pandemic.

Table 3
The Overview of Healthy Lifestyle Behaviour Changes Before and During the COVID-19 Pandemic

Variable	Before Pandemic n (%)	During Pandemic n (%)
The behaviour of wearing a mask		
No	488 (86,7)	14 (2,5)
Yes	75 (13,3)	549 (97,5)
The behaviour of handwashing with soap		
Never	53(9,4)	2(0,4)
Yes, Sometimes	177(31,4)	34(6,0)
Yes, Always	333(59,1)	527(92,6)
The behaviour of using hand sanitiser		
No	397(70,5)	165(29,3)
Yes	166(29,5)	398(70,7)
The exercise habit		
Never	179(31,8)	201(35,7)
Seldom (1-2 times/week)	293(52,0)	221(39,3)
Sometimes (1-3 times/week)	97(17,2)	56(9,9)
Normally (4-5times/week)	17(3,0)	18(3,2)
Always (every day)	18 (3,2)	25(4,4)
Bodyweight monitoring habit		
No	177(31,4)	203(36,1)
Yes	386(68,6)	360(63,9)
Cigarette smoking habit		
No	529 (94,0)	539 (94,8)
Yes	34(6,0)	29 (5,2)
Sunbathing habit		
Never	313(55,6)	75(13,3)
Seldom (1-2 times/week)	175(31,1)	202(35,9)
Sometimes (3-4 times/week)	44(7,8)	169(30,0)
Usually (5-6 times/week)	12(2,1)	60(10,7)
Always (everyday)	19(3,4)	57(10,1)

Table 4.
Changes in Healthy Lifestyle Before and During the COVID-19 Pandemic

Variables	Before	During	Positive Rank	Negative Rank	Ties	p
	Means (Min-Max)	Means (Min-Max)				
Frequency of washing hands with soap (times/day)	5,56 (0-20)	10,26 (0 - 50)	499	7	57	<0,001
Frequency of taking exercises (times/week)	1,38 (0-7)	1,53 (0-7)	166	137	260	0,037
Frequency of bodyweight monitoring (times/month)	1,76 (0-4)	1,72 (0-4)	109	110	344	0,660
Frequency of sunbathing (times/week)	0,67 (0-4)	1,68 (0-4)	383	19	161	<0,001
Sunbathing duration (min/day)	5,69 (0-45)	12,67 (0-45)	324	15	224	<0,001
Number of smoked cigarettes (cigarettes/day)	0,56 (0-24)	0,47 (0-24)	4	13	546	0,095

This study aims to obtain a picture of lifestyle changes in Indonesians, especially the study participants. The World Health Organisation (WHO) has indicated that the first action to take by an individual to protect them and people surround them from the COVID-19 is by washing their hands with soap or by applying hand sanitiser. (World Health Organization, 2020a) The Ministry of Health of the Republic of Indonesia suggests similar advice, emphasising that maintaining hand hygiene is vital to prevent the virus spread. (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2020) During the COVID-19 pandemic, the WHO alongside with other similar authorities recommends the handwashing practice to be applied correctly; as the practice has been considered as the cheapest, the easiest, and the most important way to prevent the virus spread. (Glabska,

Table 3 shows a steep increase (to 97.5%) in the community's behaviour of wearing a mask during the pandemic, as well as their frequency of washing hands using soap that had not been practised previously. Almost all participants washed their hands, with more than 50% of them applied hand sanitiser when soap was unavailable. However, two contradictory findings occurred in physical activity changes during the pandemic: some people had increased their physical activities, while others had become more sedentary (37.5%). No changes were observed in body weight monitoring and smoking habits before or during the pandemic. However, more than 50% of the participants frequently did sunbathing during the pandemic.

In this study, a statistical test for differences was carried out to see changes in health-related behaviour between before and during the pandemic. The Wilcoxon test was chosen because the data was not normally distributed. The test results showed a significant difference in the frequency of washing hands during the pandemic compared to before the pandemic with a p-value of <0.001.

We observed a significant difference in the frequency of taking exercises before and during the pandemic (p=0.037). Other than that, significant differences were also observed in the frequency of sunbathing (p<0.001) and duration of sunbathing (p<0.001). Before the pandemic occurred, the average of sunbathing duration was 5.69±8.59; however, the duration was increased to 12.67±9.24 during the pandemic. No significant differences were observed in the frequency of bodyweight monitoring (p=0.660) and the number of smoked cigarettes (p=0.095) before and after the COVID-19 pandemic.

Skolmowska, & Guzek, 2020) During the pandemic, we become more aware of our overall hygiene; the community pays their attention to the handwashing practice more than before. Many types of equipment have been modified to reduce any direct touch with human skin such as doorknobs, elevator buttons, workplaces, and stores. Moreover, many public places have provided portable washbasins or disinfectants. (China National Health Commission, 2020)

The study result observes a significant change in the frequency of washing hands before and during the pandemic (p<0.001). During the pandemic, most of the study participants (88.6%) increased the daily frequency of washing their hands. The result is in line with a study conducted in Poland that reports a significant difference in washing hands before and during the COVID-19 pandemic (p<0.001). Daily

frequency of washing hands during the global pandemic of COVID-19 was significantly higher ($p < 0.001$) because most of the study participants practised 6-15 times a day (58.4%) during the pandemic and 3-10 times a day (68.1%) before the pandemic. The good practice of maintaining hand hygiene to prevent COVID-19 spread is reflected in the global public interest in this issue and acted as a real-time indicator for policies to reduce population health transmission and literacy. (Lin, Liu, & Chiu, 2020)

Maintaining hand hygiene is essential, not only during the COVID-19 pandemic but also for other infectious diseases in the community. In addition, during the current COVID-19 pandemic, maintaining hand hygiene and wearing a mask have been proven to slow the spread of the virus exponentially. (Ma et al., 2020) A review study by Di Gennaro et al. stated that the behaviours were the most recommended behaviours to prevent the spread of COVID-19, along with wearing face masks, covering the face when coughing and sneezing, avoiding contact with infected people, maintaining an appropriate distance from others, refraining from touching the eyes, nose and mouth. In the case of symptomatic individuals, seeking medical care early and following the advice given by the health care provider was highly recommended. (Gennaro et al., 2020)

This study also found a significant difference in the frequency of exercising during the pandemic compared to before ($p = 0.037$). Almost a third of the study participants (29.5%) increased the frequency of exercise in a week, while 24.3% of the participants reduced the frequency of exercising. The reduction may be due to the participants' exercise habit before the pandemic, which was in open areas such as jogging tracks and participating in mass gymnastics, or public places such as swimming pools, gyms, and gymnastics.

Taking exercises can affect the immune system and increase anti-viral defences. (Martin, Pence, & Woods, 2009; Walsh et al., 2011) During a trial in animals induced by influenza virus and herpes simplex 1 (HSV-1) in their respiratory tract, moderate physical activities that were carried out before and after infection (for several days before the onset of symptoms) increased morbidity and mortality of infection. (Kohut, Sim, Yu, Yoon, & Loiacono, 2009; Lowder, Padgett, & Woods, 2005; Warren et al., 2015) Physical activity has strong relevance in minimising the harm of COVID-19 to human health. Active muscles will produce chemical compounds to increase immunity, which later can minimise infection rates, and reduce inflammations that cause lung damage due to the infection of SARS-CoV-2 virus. Engaging in sports or physical activity is a powerful preventive and therapeutic intervention for individuals with pre-existing chronic conditions that can increase the risk of COVID-19 infection and mortality. (Jordan, Adab, & Cheng, 2020; Powell et al., 2019). Taking exercises is also effective in preventing and treating anxiety and depression that may be experienced during this stressful global crisis.

During the physical distancing period, all socio-economic groups, ethnicities, and ages are encouraged to maintain their health by following the WHO recommendation to do 150 minutes of moderate-intensity exercise or 75 minutes of high-intensity exercise per week, or a combination of both. Muscle-strengthening activities involving large muscle groups are recommended on two or more days a week. Children and adolescents are recommended to be active for at least 60 minutes per day with strong or moderate intensity.

During the stay at home activity, due to limitations in doing outdoor activities, people often reduce their physical

activity and sports; while taking regular exercise reduces inflammation and contributes to maintaining normal body weight and reducing visceral fat accumulation. Low physical activity can be associated with several metabolic effects that will increase the risk of having cardiovascular diseases. (Aldaco et al., 2020) Although staying at home is encouraged during the pandemic, staying active and maintaining a physical exercise routine will be very important for mental and physical health. The WHO recommends some physical activities that can be done at home, such as online exercise classes, or using video-guided aerobic training or applications at home. Online exercise classes have been proven as useful, as many exercise videos can help people to exercise on their own at home. (Abbas, Fathy, Fawzy, Salem, & Shawky, 2020)

The pandemic also has an impact on the sunbathing habits of Indonesians. This study found a significant difference in the frequency ($p < 0.001$) and duration ($p < 0.001$) of sunbathing before and during the COVID-19 pandemic. The majority of the study participants (68%) had increased their frequency of sunbathing, while 57.6% of the participants had increased the sunbathing duration. A previous study on sun exposure in COVID-19 patients in Jakarta showed that a longer duration of sun exposure was associated with a higher recovery rate of COVID-19 cases. (Asyary & Veruswati, 2020) Another similar study showed that sun exposure significantly contributed to the recovery of most respiratory infections, including tuberculosis and other pulmonary diseases. (Asyary et al., 2017)

Being located in a tropical area, Indonesia can take advantage of the abundant sunshine every season. Sun exposure will boost the immune system, thereby slowing the development of influenza and SARS viruses in the human body. Exposure to direct sunlight on the human body triggers the production of vitamin D that boosts the immune system. (Slusky & Zeckhauser, 2018) Regular exposure to natural UV radiation had a positive impact on fulfilling vitamin D needs in the human body, as those who were rarely exposed to sunlight have a lower level of vitamin D. (Whittemore, 2020) Sun exposure is also needed to boost mood and release endorphins that increase immunity against diseases such as COVID-19. (Asyary & Veruswati, 2020)

The COVID-19 pandemic has a major impact on human health, affecting overall lifestyle changes in the community, especially a clean and healthy lifestyle. We hope that the improvements in this healthy lifestyle will become one of the new habits of Indonesian society. As a supporting step, education related to a clean and healthy lifestyle must also be improved. The education may include the good practice of handwashing (how and when), appropriate frequency of taking exercise, regulation of physical activity during work from home, sunbathing frequency and duration, and so on. Education can be regularly carried out by utilising various existing media so that the habit of having a clean and healthy lifestyle can be maintained even though the pandemic has ended.

CONCLUSIONS AND SUGGESTIONS

During the COVID-19 pandemic, the awareness of a clean and healthy lifestyle of Indonesians has increased compared to before the pandemic. The practise of washing hands,

wearing masks, taking exercise, and sunbathing has also increased during the COVID-19 pandemic.

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Conflict of Interest Statement

The authors declared that no potential conflicts of interests with respect to the authorship and publication of this article.

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