

Safety Cycling During Pandemic: A Descriptive Study of Cycling Behavior

Rahmah Hastuti¹, * Pamela Hendra Heng² & Abdillah Nur Zein³

^{1,2,3}Faculty of Psychology, Universitas Tarumanagara, West Jakarta 11440, Indonesia

*Corresponding author. Email: rahmahh@fpsi.untar.ac.id

ABSTRACT

Corona Virus Disease (COVID-19) causes sudden changes in an individual's lifestyle, including physical activity and sports. Cycling is an excellent mode of non-motorized transportation: it is not only healthy but also reduces congestion and air and noise pollution in urban areas, as well as being cost effective [1]. The measuring instrument used in this study, The Cycling Behavior Questionnaire, is a measuring instrument developed by Useche et al., [2] which aims to measure the behavior of cyclists on the road, there are three dimensions in The Cycling Behavior Questionnaire, namely violations, errors, and positive behaviors on the roads. This research was conducted from January to February 2022, by obtaining a research sample of 115 cyclists aged 19 to 60 years. The cyclists come from Jakarta and outside Jakarta. The research was conducted by distributing online questionnaires. From the results of the study that positive behaviors on the road were the highest among other dimensions. That is, the positive behavior shown is to support road safety. Cycling behavior cannot be distinguished by gender. However, in terms of the dimensions of violations, males are higher than females. Male cyclists are more prone to behavior that violates traffic signs on the road.

Keywords: cycling behavior, violations, errors, positive behaviors on the road, pandemic

1.1 INTRODUCTION

The COVID-19 pandemic is a global crisis that has infected a sizable portion of the world's population [1]. In addition, it was also reported that COVID-19 has resulted in a decrease in all levels of physical activity and an increase in daily sitting time of about 28% as well as an increase in unhealthy food consumption patterns [2]. An unhealthy diet will have a major impact on health. Health is an important part of human life. Maintaining health can be done by exercising, because it has been proven to be healthy for the body. Sport is one of the important aspects in forming a healthy and fit body [3]. Maintaining a healthy lifestyle (healthy lifestyle) one of them with sports activities. Carrying out a healthy lifestyle by exercising in current conditions is highly recommended for all levels of society. This is one of the measures to deal with COVID-19 with a healthy lifestyle, it is hoped that the immune system will be better so that it can help prevent the spread of COVID-19 or break the chain of disease [4].

Although the sudden changes due to the pandemic conditions have affected every individual, many individuals who regularly followed their sports activities in the gym, or on the field, or other places before the lockdown have been affected immensely. The closure of gyms and public places forced individuals to stay at home, which disrupted their

daily routines and hindered their sporting activities. While the need to stay home for long periods of time poses challenges to the continuity of physical exercise, the experience of inhibited physical activity, limited social communication, uncertainty, and helplessness lead to the emergence of psychological and physical health problems [2]. This is an important opportunity to underscore not only the importance of regular exercise, but also the surprising consequences of being physically inactive due to susceptibility to disease. The global prevalence of physical inactivity exceeds 30%, with its deleterious effects on physical and mental health causing more than three million deaths each year even before COVID-19 [5]. In the midst of the current pandemic, the closure of sports facilities such as swimming pools and gyms has severely depleted options for exercise, leading to a spike in sedentary behavior. Therefore, individuals should be advised to avoid staying at home [1].

Since the Corona virus entered Indonesia in 2020, public social activities in open spaces have begun to be limited, this is intended so that the transmission of COVID-19 can be reduced. Although participating in sports is a form of maintaining health, it is still limited. Efforts made by WHO to prevent transmission of the Corona virus are by controlling local spread through increasing public awareness, promoting personal hygiene and delaying the

cancellation of large-scale public gatherings, including in the organization of sports [6].

One of the impacts felt apart from the essential sector is that recreational activities are limited so that some people begin to adapt to look for alternative recreation. One alternative recreation that is on the rise in the past two years is cycling. Based on data obtained by The Institute for Transportation and Development Policy (ITDP) [7], on observations carried out in October 2019 and June 2020 in the Dukuh Atas area from South to North or the Senayan Roundabout to the Hotel Indonesia Roundabout (HI) in the morning, there was a significant increase in the number of cyclists from 21 to 235 cyclists.

Along with the increasing number of bicycle users on the road, the sales of bicycles have increased drastically. According to Hendra as Chief Executive Officer of PT Roda Maju Bahagia, there was a two-fold increase in bicycle sales figures in June 2020, Gozali as Brand Director of PT Inera Sena felt the same thing, an increase in bicycle sales with a percentage of 50 percent to 200 percent in several cities [8].

1.2. Our Contribution

This research is expected to contribute academically because it provides theoretical proof that safety cycling has opens new insights for readers that there is a kind of positive psychology so as to give the reader a new view that psychology is not always related to negative things but can be an inspiration to develop individual.

1.3. Paper Structure

The rest of the paper is organized as follows. Section 2 introduces the preliminaries foundation theory used in this paper, which include college student engagement and the dimensions. Section 3 explain about method, procedure, research instruments, measurement, and explanation based on demographic data. Then, the result and hypothesis testing will be stated in Section 4. Finally, Section 5 was the discussion about this research and suggestion about others research ahead.

2. BACKGROUND

Cycling is a sport activity that includes low impact sports that can maintain body fitness [9]. Cycling is an excellent mode of non-motorized transportation: it is not only healthy but also reduces congestion and air and noise pollution in urban areas, and is cost-effective [10]. Cycling is an ideal way to avoid crowds during daily commutes, but also as a problem with many short and medium term implications for road safety, transport planning, and public health [10].

Cycling is an active mode of transportation with well-established health and economic benefits, so authorities are continuing to develop specific strategies promoting cycling with the aim of increasing cycling participation [11]. Using active means of transportation for (for example), daily commute, recreation and regular trips improves the general physical and mental health of individuals [12]. It can be concluded that cycling behavior is an active non-motorized mode of transportation for daily trips or recreation which is very useful.

Useche et al. [12] states that cycling behavior consists of three dimensions: violations, errors, and positive behaviors. The violation dimension is the intentional deviation of cyclists from traffic practices or regulations that are believed to be necessary to maintain the safety of road users on the road, such as speeding or using alcohol/drugs [13]. Violation is the deliberate deviation from practices believed to be necessary to maintain the safe operation of a potentially harmful system [14].

The errors dimension is the unintentional behavior of a cyclist that results in the failure of a planned action to achieve the desired consequence, for example, a sudden brake or a misjudgment of the road or traffic situation. Errors can also be referred to as the failure of a planned action to achieve the desired consequence [14].

The positive behaviors dimension is conceptualized not as the absence of risk-related behaviors, but rather as proactive safe behaviors that have the potential to reduce the likelihood of being involved in traffic accident scenarios [13]. Cycling activities can provide many benefits for the body, including improving the health of the heart, lungs, circulatory system, preventing obesity, burning fat, and increasing energy or strength in the body [9]. Oehl et al. [15] explains that cycling has clear benefits for individual and public health, it reduces the negative effects of road transport with respect to traffic congestion and use of public spaces. Cycling also reduces transportation costs significantly for users, and is also beneficial for the macro-economy of the country [16].

Cyclists are defined as vulnerable road users, similar to pedestrians and motorcyclists, as they have the highest traffic risk compared to other road users [17]. Li et al. [13] say that cyclists are vulnerable road users and face very high levels of road trauma. It can be concluded that cyclists are road users who are prone to accidents compared to other road users.

This cycling sport emerged as a result of the implementation of PSBB in Indonesia where people feel bored at home and then do cycling activities outside the home as a way to reduce boredom, seek fresh and clean air, environmentally friendly, safe, and can maintain a distance between one cyclist with another [9].

The regulations in question are regulations for cyclists made by the government, both nationally and locally. These regulations include the development of proper infrastructure and facilities, traffic regulation, utilization of cycling areas, and rider safety [18].

This regulation will encourage people to use bicycles in their activities, because it has been regulated and protected by law [20]. Also, the goals that people pursue from cycling determine their behavioral tendencies, and this may also help explain more risky and less positive behaviors.

3. METHODS

Research Participants

The characteristics of the participants in this study were: (a) male and female; (b) Have a hobby of cycling; and (c) resided in Greater Jakarta or outside Greater Jakarta. The age of the participants has criteria that are determined based on the age of teenagers to adults because cyclists are not limited by age in relation to healthy living behavior. This research is not limited to a particular religion or ethnicity. This study involved 115 participants as a research sample for cycling behavior during the Covid-19 pandemic. According to Cohen et al. [19] a sample size of thirty was considered by the researcher to be the minimum number of cases. Usually the anticipation of a minimum of thirty cases for each variable should be used as a 'rule of thumb', i.e. the researcher must be sure to have a minimum of thirty cases for each variable.

Research Design

This research is a quantitative descriptive research that explains the variables studied and the situation experienced by the participants. The sampling technique in this research is non-probability sampling. The type of sampling used is the type of sampling with snowball sampling, namely the technique of taking samples from one participant to another and convenience sampling, namely the sampling technique based on the ease of the environment that can be reached by the researcher. Researchers distributed Google Forms in January 2022 to early February 2022. Data collection was through Google Forms, after collecting data the next stage was processing data obtained from online questionnaires.

Data processing was carried out using the Statistical Product and Service Solution (SPSS) software version 15.0 for windows.

The description of participants in this study refers to gender, age of participants, duration of cycling, and the time when they started cycling. Based on gender, from 115 participants who filled out the online questionnaire, it was found that there were more male participants than female participants. This can be seen in Table

Table 1 Description of Participants by Gender

Gender	Frequency	Percentage
Male	68	59,1
Female	47	40,9
Total	115	100,0

Based on data obtained from a total of 115 participants who filled out the online questionnaire, there was an age range between 19-63 years. Researchers grouped the age range of participants into three groups the details of which can be seen in Table 2.

Table 2 Overview of Participants by Age Group

Age Group	Frequency	Percentage
Adolescence	5	4,3
Early Adulthood	65	56,5
Middle Adulthood	45	39,1
Total	115	100,0

Based on current residence data obtained from a total of 115 participants who filled out the online questionnaire, the researchers grouped them into two groups, namely Jabodetabek (Jakarta, Bogor, Depok, Tangerang, and Bekasi) and outside Greater Jakarta. The largest number of participants in Jabodetabek was 98 people. This can be seen in full in Table 3.

Table 3 Overview of Participants by Place of Residence

Residence	Frequency	Percentage
Greater Jakarta	98	85,2
Outer Jakarta	17	14,8
Total	115	100,0

Based on exercise duration data obtained from a total of 115 participants who filled out online questionnaires, there

are six categories of duration of exercise, which can be seen in full in Table 4.

Table 4 Participant Description Based on Duration of Doing Sports

Duration (years)	Frequency	Percentage
1	17	14,8
2	20	17,4
4-5	27	23,5
More than 5	51	44,3
Total	115	100,0

the pandemic and 78 people since the pandemic. This can be seen in full in Table 5.

Table 5 Participant Overview Based on Starting to Do Sports

Start	Frequency	Percentage
After Pandemic	78	67,8
Before Pandemic	37	32,2
Total	99	100,0

Measurement

The Cycling Behavior Questionnaire

The Cycling Behavior Questionnaire, is a measuring tool developed by Useche et al. [20] which aims to measure the behavior of cyclists on the road, there are three dimensions in The Cycling Behavior Questionnaire, namely (a) violations, which are dimensions that measure behavior that violates traffic signs on the road. the cross is red, when the crossing looks empty, I cross it'; (b) errors, which are dimensions that describe unplanned behavior that results in individuals making an error on the road. Examples of statement items are, "I do not pay attention to the presence of pedestrians crossing when turning a turn"; and (c) positive behaviors on the roads. This dimension describes the positive behavior of individuals who support road safety. An example of a statement item is, "I usually maintain a safe distance from cyclists or other vehicle.

In the reliability test of the Cycling Behavior measuring instrument, it has a total of 29 statements consisting of three dimensions. The following are the results of the reliability test with the coefficient of internal consistency reliability on each dimension. Only the dimensions of violations with two

corrected items with a total correlation value below 0.2 are then dropped. This can be seen in Table 6.

Table 6 Dimensional Reliability Test of The Cycling Behavior

	Initial Reliability	Final Reliability
Items in the Dimension Cronbach's alpha	9	7
Items in the Dimension Errors Cronbach's alpha	0,579	0,605
Items in the Dimension of Positive Behavior on the Roads Cronbach's alpha	15	15
	0,858	0,858
Items in the Dimension of Positive Behavior on the Roads Cronbach's alpha	6	6
	0,776	0,776

4. FINDINGS AND DISCUSSIONS

The variable of safety cycling has three dimensions, namely violations, errors, and positive behaviors on the roads. The empirical mean value obtained is 1.10. The empirical mean obtained from the participant data that has been obtained. The hypothetical mean on the safety cycling is 2, the hypothetical mean value is obtained from the scale used, which is a scale of 0 to 4. This can be seen in full in Table 7.

Table 7 Overview of Data Cycling Behavior

Dimension	Min	Max	Mean	Std. Deviation
<i>Violations</i>	0	2,17	0,67	0,50581
<i>Errors</i>	0	2,13	0,38	0,41327
<i>Positive Behaviors on the Road</i>	0	4,00	3,35	0,76113

Based on the description of the data, the highest dimension is positive behaviors on the road and the lowest dimension is errors. Based on the data that has been obtained, the researcher conducted a normality test using the One-Sample Kolmogorov-Smirnov Test to determine the normality of the data obtained in this study. The results of the cycling behavior normality test obtained p value = $0.082 > 0.05$, so it can be concluded that the data in this study were normally distributed. Meanwhile, based on the reliability test per dimension, the results showed that the distribution of the data was not normal.

Based on the results of differences in cycling behavior by gender and other demographic data, it was measured using a parametric test using the Independent-Samples T-Test method. From the results of the analysis, it was found that there was no difference in cycling behavior based on gender, age, duration of cycling and cycling habits. The following table explains this.

Table 8 Differences in Cycling Behavior Based on Demographic Data

	Cycling Behavior		
	F	t	Sig. (2-tailed)
Sex	0,17	0,898	0,601
Age	0,039	1,508	0,138
Cycling duration	0,225	1,205	0,309
Cycling habit	1,553	0,114	0,910

Through data processing with Kruskal-Wallis H in each dimension, for the dimensions of violations there are differences and tend to be higher for male cyclists than female cyclists. This can be seen in full in Table 9.

Table 9 Different Test of Cycling Behavior Dimensions with Gender

	Cycling Behavior		
	Chi Square	t	Sig. (2-tailed)
Violations	10,653	0,01	,001
Errors	,166	0,684	,684
Positive behavior on the road	2,340	0,126	,126

	Mean Rank	
	Male	Female
Violations	66,38	45,88
Errors	56,96	59,51
Positive behavior on the road	54,08	63,67

The following are the results of additional data analysis using multiple responses regarding the reasons for cycling during the Covid-19 pandemic by participants. Researchers also include the reason for riding bicycle towards participant in to the multiple responses to test. As many as 81 participants felt happy as the reason for choosing cycling during the pandemic, in addition to other reasons, namely being more excited, motivated, happy, satisfied, feeling fresh, healthier by cycling and neutral.

Table 10 Results of Multiple Response Analysis of Feelings When Cycling \$Affect Frequencies

	Responses		Percent of Cases	
	N	Percent	N	
\$Affect (a)	Fun	81	55,9%	71,1%
	Happy	22	15,2%	19,3%
	Motivated	1	,7%	,9%
	Free	5	3,4%	4,4%
	Encourage	5	3,4%	4,4%
	Fresh	6	4,1%	5,3%
	Fit	13	9,0%	11,4%
	Satisfied	7	4,8%	6,1%
	neutral	5	3,4%	4,4%
	Total	145	100,0%	127,2%

a. Dichotomy group tabulated at value 1.

5. CONCLUSIONS

Sports activities are a fundamental factor for physical sustainability [21]. Playing regularly and practicing sporting activities is associated with a number of positive outcomes, including improved fitness, increased vitality, increased self-esteem, and reduced serious illness [22]. Therefore, a large number of studies have been conducted on motivation in sports with the aim of understanding the desire to do sports, whereas others quit or lose interest in exercising [23].

One of the different tests in this study was cycling behavior in terms of duration of cycling, cycling habits, and the results obtained were that there were no significant differences. According to Mears and Kilpatrick [24] feelings of pleasure in exercising allow individuals to spend time with different friends by enjoying sports for their own sake.

One of the results of the analysis with multiple responses is that participants feel the positive factors of cycling, feel happy as a reason for choosing cycling during a pandemic, in addition to health reasons, and so on. This is in accordance with the study of Useche et al. [17] which states that positive factors that influence cycling behavior are perceptions of health benefits, time savings during travel and environmental contributions. Another positive supporting factor, namely the existence of a pandemic, has increased public awareness for healthy living, so that it can increase immunity to prevent infection [19]. On the other hand, the most common negative factors were related to the perception of traffic accident risk, interaction with adverse weather conditions and the discomfort of cycling when traveling long distances and facing difficult topographical conditions [17].

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