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THE CITY BIKE AS A SAFE MODE OF TRANSPORT DURING THE COVID-19 PANDEMIC

A b s t r a c t: The main aim of the article was to show the positives of using city bikes. The introduction lists the most important information about the pandemic and the possibility of infections. Then general information on bicycle transport is provided. The study also includes the results of the study, the purpose of which was to find out the respondents' opinions on the risk of infection while using city bikes. Finally, the results of the research are summarized and the author's observations are presented

K e y w o r d s: city bike, Covid-19 pandemic, safety.

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1. ADMISSION

An economic crisis such as the Covid-19 pandemic occurs every few generations in the world and is causing lasting and far-reaching change. Actions taken to suppress the epidemic lead to the collapse of the economy of almost every country in the world.

The coronavirus pathogen is spread by airborne droplets, i.e. droplets exhaled by another person. The virus is mainly transmitted through talking, sneezing and coughing. To a limited extent, the coronavirus can spread through objects or surfaces [6].

The fact is that the risk of Covid-19 infection in confined spaces is much higher than in the open air. To investigate this phenomenon, Professor Suresh Dhaniyala of Clarkson University conducted an experiment to show how aerosols that come out of the mouth spread around a closed room. To this end, aerosol particles with dimensions similar to those transmitted by humans were sprayed into a room measuring 7 by 9 meters. Then, their movement in the air

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was monitored by sensors. It turned out that the particles reached the other end of the room within 10-15 minutes. A properly functioning ventilation played a good role, thanks to which the concentration at the end of the room was 10 times lower than at the spray site. This means that the greatest risk of infection is close to the host, but the virus spreads very quickly, putting people at greater distances at risk [4].

1. CITY BIKE

1.1. ADMISSION

Professor Dhaniyal's experiment shows how big a problem in the fight against the pandemic is public transport. Despite the restrictions on the number of passengers, these are still closed places with a very large number of people. And the speed at which the virus spreads in confined spaces was discussed earlier. The solution to this problem may be encouraging residents to use private or city bikes. It is much safer because the air circulation outside is much greater, and the wind causes the dilution effect to appear very quickly. Of course, it is still important to follow the rules of distances from 1.5 m to 2 m, as infection cannot be ruled out in large clusters and small distances [3].

1.2. BIKE TRANSPORT FEATURES

Bicycle transport is a type of road transport in which a bicycle is used to travel. According to the Law on Road Traffic [13]: "a bicycle is a vehicle with a width not exceeding 0.9 m, moved by the strength of the muscles of the person riding the vehicle; the bicycle may be equipped with a pedal-operated electric drive and may have an auxiliary electric drive supplied with a voltage of no more than 48 V with a rated continuous power of no more than 250 W, the output of which decreases gradually and drops to zero after exceeding the speed of 25 km / h ".

Bicycles may be used on roads and bicycle lanes. When bicycle paths are inaccessible, cyclists can move along the road along with other road users. "A cycle path is a road or part thereof designated for bicycle traffic, indicated by appropriate road signs; a cycle track is separated from other roads or the carriageway of the same road either by construction or by road safety devices. Bicycle lane - a part of the road intended for bicycle traffic in one direction, marked with appropriate road signs" [13].

The development of each mode of transport depends on the appropriate infrastructure. Warsaw is a city with the most extensive bicycle infrastructure in Poland. There are nearly 500 km of bicycle paths there. The next cities in the

ranking are: Wroclaw (237 km) and Cracow (168 km). The table below (Table 1) summarizes the length of bicycle routes in 14 Polish cities - data for 2017 and the ratio of the length of bicycle routes to the length of public roads - data for 2020.

Table 1. Summary of the length of bicycle routes in selected Polish cities - data for 2017

City	Length of bicycle routes [km]	The ratio of the length of bicycle paths to the length of public roads [%]
Rzeszów	137 km	47 %
Białystok	112 km	34 %
Katowice	160 km	32 %
Wrocław	237 km	30 %
Lublin	141 km	29 %
Olsztyn	75 km	29 %
Warsaw	675 km	29 %
Poznan	157 km	26 %
Gdańsk	143 km	24 %
Zielona Góra	72 km	24 %
Łódź	150 km	23 %
Opole	72 km	22 %
Cracow	168 km	20 %
Szczecin	126 km	17 %

Source: own study based on [7,11]

Bicycle transport has a number of advantages that cannot be overestimated, especially in heavily crowded cities. The main disadvantage of this solution is the dependence on weather conditions. The list of all benefits and limitations is presented in the table below (Table 2).

Table 2. Summary of benefits and limitations of using bicycle transport.

Bicycle transport	
Benefits	Restrictions
• Reduction of pollution, • Noise reduction, • Low cost of travel, • Contributing to increasing the liquidity of cities, • Fast transport in conditions of congestion, Health Benefits.	• Seasonality of the solution, • Dependence on weather conditions.

Source: own study based on [10]

2. RESEARCH

2.1. TEST PURPOSE AND RESEARCH METHOD

According to A. W. Maszke [9], each research must have a definition of research goals that are necessary for implementation. He also believed that research goals should be established during research preparation. Moreover, they should be defined clearly, precisely and as broadly as possible.

The aim of this study was to understand the assessment of the risk of Covid-19 infection in the opinion of city bike users and to determine what preventive measures users use to reduce this risk.

In this paper, the survey method was chosen as the research method, also known as the diagnostic survey method. J. Apanowicz [1] defines it as a scientific undertaking that consists in the statistical collection of information (data) about the studied phenomenon. The collected data make it possible to determine its scope, level and intensity, which makes it possible to evaluate their causes and effects. As a result, propose a different solution. The diagnostic survey method allows to explain some mass phenomena and processes occurring in the sets on the basis of representative static tests.

The article uses a diagnostic survey (questionnaire) as a research technique. W. Zaczyński [14] believes that a questionnaire is a method of direct obtaining information by asking selected people questions using a questionnaire. According to the Dictionary of the Polish Language, the term survey is related both to the questionnaire with questions about the topic under study and the collection of information on a specific topic. The survey uses questions addressed to a specific group of people. It can be carried out orally, in writing, or via radio, television or the Internet [12]. The survey used for the purposes of the study was conducted using the Internet.

For the purposes of this work, a questionnaire was used, intended to register the answers of the respondents. It contained a conscious composition of questions regarding the safety assessment of city bike users during the coronavirus pandemic.

2.2. ORGANIZATION AND COURSE OF THE TEST

The organization of research depends on many circumstances, which are: the nature and purpose of the research, the techniques used and the area in which the research is conducted. The process of organizing research consists of the concept and execution phases. The correctness of the conducted research depends both on the competences of the researcher, but also on the validity of the undertaken problem. The ability to use selected research methods is also of great importance [9].

For the purposes of the study, own research was carried out among users of the Poznan City Bike system. In order to obtain reliable results, they were carried

out on a group of 101 people. A research tool was used to collect the data, i.e. a questionnaire consisting of 10 questions. The study lasted about 2 weeks and was conducted with the help of the Internet.

The complete anonymity of the survey encouraged the respondents to honest and objective answers about the assessment of the current state and preferences regarding the PRM system.

The individual stages of the conducted research are presented in the table below (Table 3).

Table 3. Stages of the conducted research

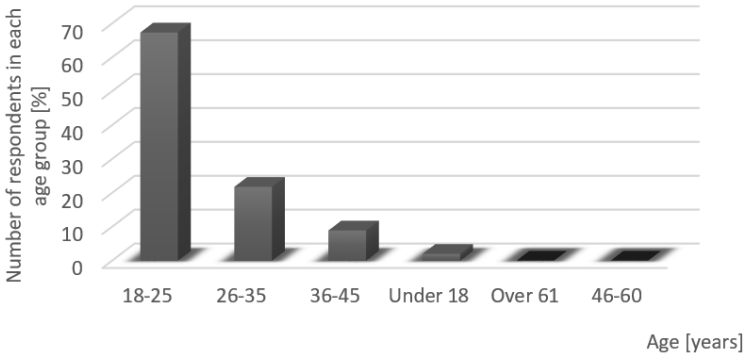
Stage	Stage name
1	Arranging the study
2	Defining the purpose and research methods, creating a plan
3	Creating a questionnaire for respondents
4	Testing the questionnaire
5	Collecting the results
6	Analysis of the collected materials
7	Summary

Source: own study

2.3. CHARACTERISTICS OF THE RESEARCH COMMUNITY

The participants of the study were people living in Poznan (53% are permanent residents of Poznan, and 47% are temporary residents of Poznan). The largest part of the respondents were young people aged 18-25 - 67% (Figure 1).

Figure 1 Age of respondents.



Source: own study

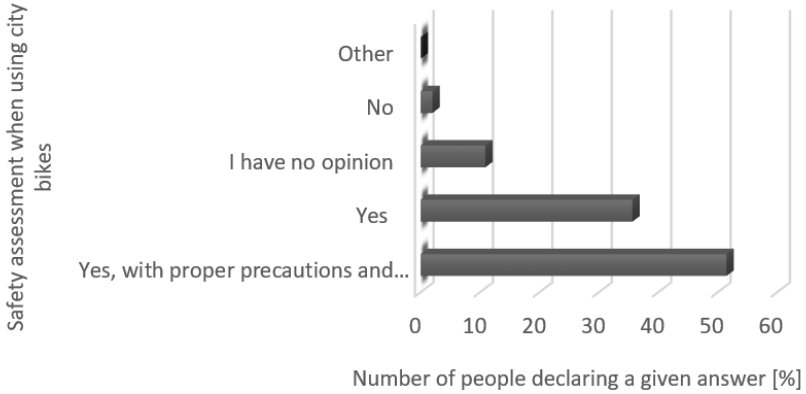
Another group reaching 22% were people between 26-35 years of age. The respondents aged 36-45 constituted 9%, and those under 18 - 2%. People over 46

did not take part in the study. The predominant group of respondents were men (71%), and only 29% were women. Mainly the results were obtained from people using city bikes (85%), while the remaining 15% of respondents never used city bike systems. The survey included questions about the safety and risk of infection when cycling, and about the preventive measures taken by bike sharing users.

2.4. FINDINGS

The graph (Figure 2) shows the safety assessment of bicycle use during a pandemic. As can be seen below, 87% of users rate the use of bikes as safe (52% emphasize that they are safe with appropriate precautions and hygiene). Only 2% of the respondents think the opposite. The remaining 11% of respondents do not have an opinion on this subject.

Figure 2. Safety while using city bikes during the Covid-19 pandemic as assessed by the respondents



Source: own study

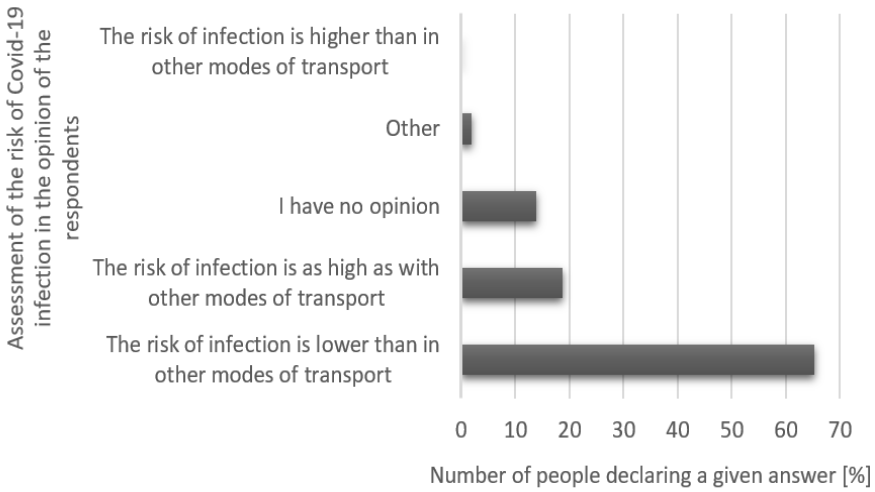
The next question (Figure 2) concerned the determination of the level of risk of Covid-19 infection compared to other modes of transport. Here, too, the bike fared positively. As many as 65% of respondents believe that when using city bikes, the risk of infection is lower than in the case of other means of transport. None of the respondents considered that the risk was higher. The remaining 19% believe that the risk of contamination from a bicycle is the same as from any other means of transport. 14% of respondents do not have an opinion on this subject.

Bicycles are considered a safe means of transport because they take place outdoors. Bike users avoid crowds of people both inside public transport and without waiting at stops.

Then, respondents were asked what preventive measures they use to protect against infection. The results of the study are shown below (Figure 3). More than half of the respondents – 55% rent bikes through the application, while a large

part – 35% do not use any preventive measures. 22% of users wear gloves while riding and renting a bike, and 15% spray the bike with disinfectant, and 12% use antibacterial wipes. 3% of the respondents selected the "other" option and entered that they disinfect their hands after finishing the ride and returning the bike.

Figure 3. The risk of Covid-19 infection during the use of bike sharing as assessed by the respondents



Source: own study

Figure 4. Preventive measures used by respondents

Source: own study

A large percentage of people not taking any preventive measures may indicate that users are not concerned about the risk of infection. Most of them are young people who are less susceptible to complications following infection. Perhaps they

think they are safe because they are cycling outdoors. The remainder uses basic hygiene measures responsibly, which proves the high awareness of users.

2.5. CONCLUSIONS AFTER THE TESTING

87% of users rate the use of bikes as safe (52% emphasize that they are safe with appropriate precautionary and hygiene measures). As many as 65% of respondents believe that when using city bikes, the risk of infection is lower than in the case of other means of transport.

Bicycle transport takes place in the open air. Cyclists tend not to walk side by side they meet on bicycle paths only when passing or overtaking. By using this means of transport, you can easily limit contact with people, and thus reduce the risk of infection with coronavirus and other viruses. The study showed that a large proportion (65.3%) of PRM users use preventive measures, which proves high awareness and responsibility.

3. SUMMARY

The Covid-19 pandemic, which began in Poland in early 2020, turned the lives of Poles upside down. The effects of the pandemic, as well as the restrictions introduced to suppress it, caused various emotions in people. One thing is for sure, everything should be done to contain epidemics as quickly as possible and leave it far behind. One way to combat it is to limit the use of public transport, which is a great place for an epidemic to spread. Having a nearby route to cover, it is advisable to use your own or city bikes. Researchers from Finland came to similar conclusions a year ago. According to the guidelines of the Finnish Institute of Health and Social Affairs (THL), bicycles can reduce the number of people-to-people contacts that pose a risk of SARS-Cov-2 coronavirus infection. If someone has to move around, the bicycle is now "the best way to get around". The user of the city bike "remains in the open space and can keep a safe distance from other people" [2].

Appropriate facilities, exemptions from fees or recommendations regarding the use of two-wheelers have been introduced, among others by the authorities of Vienna, Budapest, London, Paris, Bogota, including American cities such as New York, Chicago and Philadelphia. A clear signal in favor of cycling was also given by the German government [5]. The author believes that the reduction or exemption from charges for renting bicycles may have a very positive impact on the number of rentals. Consequently, possible reduction in the use of public transport, where the risk of infection is much higher.

In addition to the lower risk of infection, this has other positive effects. They are: ecology, reduction of congestion and noise in cities, health benefits, better well-being, low cost of travel. Of course, one cannot forget about limitations such

as: seasonality of the solution and dependence on the weather. However, with such a large number of advantages, the disadvantages are almost imperceptible.

The aforementioned ecology cannot be overestimated in bicycle transport. Currently, there is a lot of emphasis on sustainable development and alternative means of transport, and the bicycle fits perfectly into them. Using it improves city fluidity, reduces smog and noise levels, and reduces congestion in cities. Often, in the city center, we will cover a route by bike faster than by car or public transport.

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