ORIGINAL ARTICLE
SECURITY SCIENCE

Coronavirus COVID-19 transmission level among employees and students of the Podhale State College of Applied Sciences in Nowy Targ

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Received: 10 November 2020; **Accepted:** 14 December 2020; **Published online:** 12 January 2021

AoBID: 14747

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

Abstract

Background & Study Aim: Healthcare systems in all countries are maximizing efforts to mitigate the spread and mortality of COVID-19. Universities are among the institutions where the effect of such efforts has been significantly limited during coronavirus pandemic. Preventing the transmission of SARS-CoV-2 in higher education institutions presents a unique challenge due to communal living environment and the difficulties in limitation of socializing and group meetings. The aim of the study was the knowledge of coronavirus COVID-19 transmission level among the staff and students at Podhale State College of Applied Sciences in Nowy Targ (PSCAS).

Material & Methods: The study used data on COVID-19 transmission among the employees and students of the PSCAS between October 26, 2020 and July 4, 2021. The secondary analysis of the existing data was used for the research.

Results: During the entire observation period, 32 people were infected, which accounts for 12.8% of this occupational group. On the other hand, 153 people (academic teachers), i.e. 61.2% of all employees, were in quarantine or self-isolation. Among the students, 11 were infected (0.55%), and 28 students were in quarantine or self-isolation, representing 1.9% of all students.

Conclusions: The introduction of the sanitary regime and the organization of all classes in the remote system contributed to the gradual reduction in the transmission of coronavirus among employees and students of PSCAS. These activities were of great importance for the of health and life protection of the entire academic community. The strategies for dealing with the pandemic developed by the University authorities effectively minimized the risk of infections in PSCAS, and thus, not only employees and students, but also their families and closest friends were secured.

Key words: infections • pandemic • quarantine; universities • vaccination

Conflict of interest: Authors have declared that no competing interest exists

Ethical approval: The study was approved by the local ethics committee

Provenance & peer review: Not commissioned; externally peer reviewed

Source of support: Departmental sources

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INTRODUCTION

COVID-19 was for the first time discovered in Wuhan, the city of China. Shortly after that, it spread, resulting in a global pandemic [1]. On December 1st 2019, the first symptoms of COVID-19 developed in first patients, followed by an abrupt transmission of the virus from one person to another and its intercontinental spread [2]. The virus responsible for this disease was named "coronavirus of severe acute respiratory syndrome (SARS-CoV-2)", and the disease developed from it was named coronavirus disease 2019 (COVID-19) [3]. In Poland, the first case of COVID-19 infection was noted on March 4th, 2020. On March 11th, the World Health Organization (WHO) announced pandemic of COVID-19, reporting over 118 000 cases of coronavirus disease in over 110 countries worldwide. Presently, over 200 countries are affected by the spread of the new variation of this virus. Coronavirus is a large family of viruses which, in over the last two decades have resulted in serious health problems among the population. SARS-CoV-2, respiratory syndrome coronavirus in the Near East and coronavirus 2019 (COVID-19) are some well-known examples of coronavirus diseases resulting in destructive epidemic spread on the large scale worldwide [4].

Infection with coronavirus including SARS-CoV-2 is manifested by severe flu-like symptoms which can lead to acute respiratory distress syndrome (ARDS), pneumonia, kidney failure and death [5, 6]. Usually, it is an airborne disease with a highly varied course. The symptoms include fever with body temperature reaching even 39°C, dry cough and problems due to breathlessness and chest pain. Other symptoms include smell and taste disorders and atypical fatigue [7]. The time of COVID-19 incubation ranges from 5 to 14 days. This period is essential for proper monitoring of the disease.

Healthcare systems maximize efforts in all countries to reduce epidemic spread and mortality rate due to COVID-19. Universities are among the places where spread of the virus has contributed to significant limitations in activities. Prevention of SARS-CoV-2 epidemics is an extreme challenge due to the necessity of collective participation in classes and problems resulting from limitation of social life and group meetings [8, 9].

According to WHO data, on July 10th, 2021 185 291, 530 infections and 4 010 834 deaths due to coronavirus were confirmed [10]. On the same day, in Poland there were 2 880 670 confirmed cases and 75 152 deaths [11]. Since December 27th, it is possible to receive vaccination against SARS CoV-2 virus. The population worldwide has already received 3 078 787 056 vaccine doses [10], and in Poland 31 100 882 citizens have been vaccinated [11].

Only in the United States, over 320 000 cases of COVID-19 and 80 deaths have been noted in more than 1700 universities. Due to frequent close contacts between students, the probability of virus transmission has been increasing and over one third of university staff is over 55 years old, which also increases the risk of infection and mortality due to COVID-19 [9, 12].

In Poland, neither general statistics concerning the incidence of viral infection among students and university staff, nor the number of vaccinations in these entities have been presented so far. Therefore, it is essential to present the information on the level of coronavirus transmission based on the data collected in Podhale Universities. Assuming that a representative number of reports will be published, it will be possible to determine the scope of the problem and assess the efficacy of pandemic coping strategy at universities.

The aim of the study was the knowledge of coronavirus COVID-19 transmission level among the staff and students at Podhale State College of Applied Sciences in Nowy Targ (PSCAS).

MATERIAL AND METHODS

The data on COVID-19 transmission among the staff and students of Podhale State College of Applied Sciences in Nowy Targ, Poland were collected between October 26th 2020 and July 4th 2021. Presently there are 2030 students in 14 departments and 250 employees (teachers and administration employees). The existing data was applied were subjected to secondary analysis [13]. The data were collected from weekly reports sent to the Ministry of Education and Science (MES). New infections were reported as well as already infected persons and people in quarantine or self-isolation

Pain – *noun* the feeling of severe discomfort that a person has when hurt (NOTE: Pain can be used in the plural to show that it recurs: ***She has pains in her left leg***.) [54].

Stress – *noun* **1.** physical pressure on an object or part of the body **2.** a factor or combination of factors in a person's life that make him or her feel tired and anxious **3.** a condition in which an outside influence such as overwork or a mental or emotional state such as anxiety changes the working of the body and can affect the hormone balance [54].

Sten – A sten score indicates an individual's approximate position (as a range of values) with respect to the population of values and, therefore, to other people in that population. The individual sten scores are defined by reference to a standard normal distribution. Unlike stanine scores, which have a midpoint of five, sten scores have no midpoint (the midpoint is the value 5.5). Like stanines, individual sten scores are demarcated by half standard deviations. Thus, a sten score of 5 includes all standard scores from −0.5 to zero and is centered at −0.25 and a sten score of 4 includes all standard scores from −1.0 to −0.5 and is centered at −0.75. A sten score of 1 includes all standard scores below −2.0. Sten scores of 6-10 "mirror" scores 5-1. (***Wikipedia***).

Martial arts – *plural noun* any of various systems of combat and self-defence, e.g. judo or karate, developed especially in Japan and Korea and now usually practised as a sport [54].

(those in self-isolation also included people sent to permanent or hybrid remote work). Such persons were counted regardless the type of employment or doing part time work. The data concerning the employees were reported till the end of October 2020 as the university authorities did not have to inform MES about the number of infected people and those in quarantine earlier.

RESULTS

During the entire period of observation, 32 persons were infected, accounting for 12.8% of this occupational group. 153 persons (academic teachers) were in quarantine or isolation, what made 61.2% of all the employees. As for the students, 11 of them (0.55%) were infected and 28 (1.9%) were in quarantine of isolation. Between March 29th, 2021 and April 11th, 2021, the remaining employees (who are not academic teachers) were sent home to do remote or hybrid work and this was connected with the Easter period (Table1).

During the initial period of pandemic spread, at all departments the classes were remote and since November 2020, at six departments with a practical profile the hybrid learning system was applied, which means that practical classes were conducted at the University in compliance with sanitary regime while remote teaching was introduced in the remaining 8 departments (Table 2).

Table 1. Weekly reports sent by PSCAS in Nowy Targ to the Ministry of Education and Science.

Reported week		Students		Employees in general			Other employees (from 22.03.2021r.)		
from Monday	to Sunday	new infected	quarantine or self-isolation	new infected	still infected	quarantine or self-isolation	new infected	still infected	quarantine or self-isolation
26.10.2020	01.11.2020	4	12	4	6	12	x	x	x
02.11.2020	08.11.2020	2	3	5	7	15	x	x	x
09.11.2020	15.11.2020	0	5	1	7	15	x	x	x
16.11.2020	22.11.2020	0	1	0	3	17	x	x	x
23.11.2020	29.11.2020	1	3	1	0	12	x	x	x
30.11.2020	06.12.2020	0	0	1	0	14	x	x	x
07.12.2020	13.12.2020	0	0	0	0	13	x	x	x
14.12.2020	20.12.2020								
21.12.2020	27.12.2020	1	2	0	0	14	x	x	x
28.12.2020	03.01.2021								
04.01.2021	10.01.2021	0	0	0	0	2	x	x	x
11.01.2021	17.01.2021	0	0	0	0	1	x	x	x
18.01.2021	24.01.2021	1	1	0	0	1	x	x	x
25.01.2021	31.01.2021	0	0	0	0	3	x	x	x
01.02.2021	07.02.2021	0	0	0	0	0	x	x	x
08.02.2021	14.02.2021	0	0	0	0	1	x	x	x
15.02.2021	21.02.2021	0	0	1	0	1	x	x	x
22.02.2021	28.02.2021	0	0	0	1	1	x	x	x
01.03.2021	07.03.2021	0	0	1	0	3	x	x	x
08.03.2021	14.03.2021	0	2	2	1	5	x	x	x
15.03.2021	21.03.2021	1	3	3	2	8	x	x	x
				Academic teachers			Other employees		
22.03.2021	28.03.2021	0	1	1	3	5	0	0	0
29.03.2021	04.04.2021	0	0	0	1	3	0	0	79
05.04.2021	11.04.2021	0	3	0	0	1	1	0	22
12.04.2021	18.04.2021	0	0	1	0	2	0	0	7
19.04.2021	25.04.2021	0	0	0	1	0	0	0	2
26.04.2021	02.05.2021	1	1	0	0	0	0	0	1
03.05.2021	09.05.2021	0	1	0	0	1	0	0	2
10.05.2021	16.05.2021	0	0	0	0	2	1	0	1
17.05.2021	23.05.2021	0	0	0	0	0	0	1	1
24.05.2021	30.05.2021	0	0	0	0	1	0	0	1
31.05.2021	06.06.2021	0	0	0	0	0	0	0	1
07.06.2021	13.06.2021	0	0	0	0	0	0	0	1
14.06.2021	20.06.2021	0	0	0	0	0	0	0	0
21.06.2021	27.06.2021	0	0	0	0	0	0	0	0
28.06.2021	04.07.2021	0	0	0	0	0	0	0	0
sum		11	38	21	32	153	2	1	118

Table 2. The forms of teaching during COVID-19 pandemic.

Time period	Students	
	The number of departments where classes were:	
	entirely remote	hybrid
March 2020 to 15th of November 2020	14	0
16th of November to July 2021	8	6

Almost one third of the employees and 10% of the students took the opportunity to be vaccinated against COVID-19.

DISCUSSION

The discussion on COVID-19 transmission pathways is still ongoing, however, it is necessary to consider some procedures aimed to improve air condition through room ventilation, especially in hospitals and crowded places including universities. It is important to keep more than 2 m distance between people, determine the minimal relative humidity norm, etc. Observing the above recommendations can be useful in reduction of general environmental levels or bioaerosols in the air and, finally reduction of SARS-CoV-2 transmission through the respiratory tract. Finally, apart from other guidelines from the centers and authorities, it is recommended to consider such steps as: searching cases of infection, isolation and quarantine, washing hands, keeping social distance and using materials for disinfection of surfaces in crowded places. It is also believed that airborne transmission protects health service employees, patients, especially at hospitals and the community in other public facilities [14].

Universities are the places where students live and study, being often close to one another, they are also lively cultural centers. Not long ago, the fast spread of coronavirus (COVID-19) epidemics significantly affected functioning of these centers, resulting in significant changes in work style, both in the employees and students. These changes have also been noted at one of the main University of Podhale, where, due to the introduction of numerous ministerial regulations and Rector's rules, numerous restrictions were implemented to reduce virus transmission. Such countries as South Korea [15], Singapore [16] and Iceland [17] are excellent examples of implementation of such procedures, showing that it is possible to stop the epidemics by well-developed tests, tracing contacts and quarantine.

The results indicate a gradually diminishing level of COVID-19 incidence among the studied groups, resulting from the systematic introduction of sanitary regime in PSCAS, including limitation of classes at university facilities to minimum.

As it is not absolutely necessary to inform University authorities about COVID-19 infections among students, we may assume that the obtained results can be taken as estimates. Identification and isolation of infected persons may be difficult – since there is a high percentage of pre-symptomatic or asymptomatic patients, or those with minimal symptoms, who can actively transmit the virus [18-20]. Importantly, students belong to the age group which is often asymptomatic, so they may not know that they are ill.

The employer's duty is to take all available measures to eliminate exposure to harmful biological factors and, if it is not possible, to limit the degree of exposure using effectively the achievements of science and technology. Undoubtedly, the actions aimed at quick and effective search of and elimination of COVID-19 outbreak in institutions are necessary and require logistic mobilization of employers and services responsible for employers' and students' health protection.

The members of the crisis staff regularly met to discuss the actualizations concerning pandemic and, if necessary, recommend implementation of new preventive measures at the University. The team coordinated implementation of teaching online and the rules pertaining to public meetings. They also ensured an adequate supply with personal protection equipment and solved all financial problems.

Since December 27th everyone can be vaccinated against SARS CoV-2 virus. PSCAS have organized vaccination for the employees and students. The first cycle of vaccination took place on March 16th 2021. The second dose was administered on June 8th. The data collected by the University are understated since a large group of university staff are health service employees (physicians, nurses, physiotherapists and medical rescue team members) who received a zero dose at their workplaces. These data were collected by the University authorities. Regretfully, the percentage of vaccinated population in Podhale is lower than the national average (about 37%). Several towns and villages in Podhale are at the end of the ranking list. In Lipnica Wielka only 8.8% received vaccinations while in larger towns such as Nowy Targ, Zakopane and Szczawnica, the percentage of vaccinated population was: 32,5%, 35,9% and 34,4% respectively [21]. Therefore, the level of vaccination at PSCAS may be regarded as high due the consciousness of the significance of being vaccinated against COVID-19 in trying to return to offline teaching.

The presented data are the basis of further assessment of health state among PSCAS community. Retrospective analysis of the mental condition of employees and students will be an important element of decision-making process as the increased workload, working in unknown areas and under unknown conditions, the omnipresent relations in the media and fear of the family and friends' health may contribute to mental stress increase, which is likely to maintain for a long time.

The results of our research unequivocally allow to state that the implemented strategies of acting during pandemic and lockdown have contributed to a large extent to reduction of virus transmission in PSCAS, and thus, to gradual return to offline work.

However, the effectiveness of prevention based on vaccination only would be a misconception. So is the general thesis that systematic involvement in physical activity is an important preventive measure. This area, especially sport, differs in many respects. The results of the important research conducted by Makarowski et al. [22] indicate that prior to pandemic the level of stress was average (4-5 sten) in all athletes (n = 781) from Poland, Romania and Slovakia including those training martial arts (n = 116). During the peak of pandemic (when athletes from 10 countries underwent medical assessment (n = 1032), including those involved in martial arts (n = 396), in the subgroup of Polish and Romanian athletes the level of stress was very low (1-3 sten). Moreover, the lowest levels of emotional tension were noted in martial arts athletes from Romania while the highest stress levels were noted in their counterparts from Lithuania and Spain. Conversely, the lowest levels of *intrapsychic stress* were noted in athletes training martial arts in Poland while the lowest stress levels were found in Lithuanian athletes [22].

Therefore, this heterogeneity concerns also the quality of the didactic staff and probably other environmental and characterological factors. Therefore, after our dramatic experience with pandemic, we cannot overestimate the results of the latest research on the personality, not only in martial arts athletes [23-27]. This new experience of global threat will contribute to seeking innovative solutions for extreme circumstances in a complementary way [28-31], including these pertaining to widely understood survivability [32, 33].

Paradoxically, in this new social reality, not only the research diagnosing subjective perception of positive health (in the somatic, mental and social dimensions), but also the sense of survivability will become more important [34-40]. We should expect that the verification of such phenomena (regardless of the necessity to break many barriers [41, 42]) as well as the recommended scientific approaches using simple methods and tools will raise a more cognitive interest [43-46, 36-40]. So far, only sparse studies used such a verification, referring to somatic health [47, 48]. Besides, we recommend the necessity of synthesis of the research dedicated to implementation of innovative health education programs [49] and training systems for specialists in this branch [50]. On the other hand, we recommend synthesis of the respondents' opinions on legitimacy of such initiatives [51] and expert opinions on the limited consequences of the effects of pattern transfer from the sport to health prevention practice [52] (in extreme cases, the initiatives are counteracting [e.g. 53]).

CONCLUSIONS

The introduction of the sanitary regime and the organization of all classes in the remote system have contributed to the gradual decrease

in the transmission of coronavirus among PSCAS employees and students. These activities were of great importance for the protection of the health and life of the entire academic community.

The strategies developed by the University Authorities to deal with the pandemic have effectively minimized the risk of infections in PSCAS,and thus not only employees and students, but also their families and closest friends have been secured.

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Cite this article as: Klimczak J, Kurzeja P, Gąsienica Walczak B et. al. Coronavirus COVID-19 transmission level among employees and students of the Podhale State College of Applied Sciences in Nowy Targ. Arch Budo Sci Martial Art Extreme Sport 2020; 16: 1-7