Effect of COVID-19 pandemic on health behaviours of students of medical specialities from the aspect of psychological support based on a Polish example

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▌ Abstract

Introduction and Objective. The aim of the study was to evaluate the effect of the COVID-19 pandemic on health behaviours of students of medical specialities from the aspect of psychological support in Poland.

Materials and Method. A study was conducted from 6 June – 16 December, 2022 among students of the Collegium Medicum at the Jan Kochanowski University in Kielce (CM UJK), Poland, and the Medical University of Warsaw (WUM). The final analysis covered 517 students of full-time studies – 265 (51.06%) students from CM UJK and 253 (48.94%) from WUM. Health behaviours as a result of the COVID-19 pandemic from the aspect of psychological support were investigated using the standardized questionnaire Health Behaviour Inventory (HBI), and an author-constructed questionnaire. Positive mental attitude, preventive behaviours, and proper eating habits were taken into consideration.

Results. The results indicated greater care for own health among students from CM UJK. It was found that every fifth respondent (178; 34.43%) reported the need for psychological support. A statistically significant relationship was observed between the need for psychological support and low health behaviour in terms of positive mental attitude (p<0.001) and health practices (p<0.001) of the examined students. Those who declared the need for psychological support were characterized by low psychological attitude (p<0.001) and felt lonely during the pandemic, which was the result of isolation and remote classes (p<0.001).

Conclusions. The COVID-19 pandemic exerted a negative effect on the health behaviours of students of medical specialities in the area of psychological health. The feeling of loneliness and lack of social contacts exposed the health behaviours of the examined students.

▌ Key words

psychological support, health behaviours, COVID-19 pandemic, students of medical specialities

INTRODUCTION

At the beginning of 2020, the World Health Organization (WHO) admitted that the COVID-19 pandemic is a challenge for the public health sector of internationally, and in the dimension of the systems of education and health care [1, 2]. In order to limit the spread of the COVID-19 pandemic, all countries were obliged to introduce public health restrictions, which included quarantine, social distancing or lockdown [1–3]. In Poland, lockdown and social distancing were in effect in 2020 and 2021. A rapid increase in the number of diagnosed new infections, disinformation in public opinion, and sudden reaction of the government exerted an effect of the health of society from both the physical and psychological aspects [4, 5].

Due to limited didactic activities of the universities, transition into distance education, and encouraging students of medical specialities to actively participate in combatting the effects of the pandemic, they were exposed to previously unknown stress factors, frequently without support providing a sense of stability [6, 7]. The lack of access to open education, an uncertain academic future, concerns about the effect of COVID-19 on health and life, constituted a great barrier in eliminating anxiety and stress among young students [8, 9]. Earlier studies confirmed that the evolving COVID-19 pandemic resulted in an increased threat of the

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occurrence of depression and suicidal thoughts in the group of students [10–12], whereas social support and strategies of coping provided protective elements. It was also observed that during the period of the pandemic, students attempted to relieve their emotional tension by consuming alcohol or smoking cigarettes [1, 2].

Positive health behaviours should be promoted at all ages because studies indicate that that particular element of life style exerts an effect on the clinical course of COVID-19 [13, 14]. Therefore, there is a need for specific actions in the public health sector in order for students to eliminate anxiety and fear through positive health practices which, additionally, prolong life [2]. Previous studies indicate that the transition to higher education is a decisive moment for developing healthy habits for future years [15, 16]. The introduction of numerous pandemic restrictions, including primarily closure of higher education institutions, became an opportunity for students to increase physical activity, as well as extend sitting time which, in their case, on average, may be as long as nine hours [17]. During the pandemic, an alarming phenomenon was observed – a decrease in physical activity and increase in sedentary life style by as much as 28.6%. Negative phenomena also concerned eating habits [4].

Health knowledge, which is especially important in the process of the education of students of medical specialities, has a positive effect on the feeling of anxiety and enhancement of positive health behaviours. Knowledge of health reduces the risk of absorbing false information [18] concerning the pandemic, is associated with better access to health services, and exerts an effect on the quality of life and better state of health [2].

The aim of the study was to evaluate the effect of the COVID-19 pandemic on the behaviours of students of medical specialities from the aspect of psychological support in Poland.

MATERIALS AND METHOD

A study was conducted during the period 6 June – 16 December 2022, within the research project 'Health behaviours of academic teachers and students of selected specialities in the Collegium Medicum at the Jan Kochanowski University in Kielce, and Medical Universities in Poland from the aspect of epidemiological situation (COVID-19)'. On 3 June 2022, the study was approved by the Bioethics Commission at the CM UJK (Resolution No. 29/2022). The study was carried out among full-time students of medical specialities at the Medical University of Warsaw (WUM), and the Collegium Medicum at the Jan Kochanowski University in Kielce (CM UJK). Participation in the study was voluntary and was carried out using an author-constructed questionnaire containing particulars concerning the evaluation of the effect of the COVID-19 pandemic on health behaviours. The second tool used was the standardized questionnaire – Health Behaviour Inventory (HBI), which includes four factors: positive mental attitude, preventive behaviours, proper eating habits, and health practices. For each group of factors, six items were defined, where the respondents could indicate their health behaviours according to a 5-point scale (1–5). Stens were also specified (1–10) for the score obtained from the sum of the obtained raw results, separately for males and females. Reliability of the tool was tested using the

Cronbach's alpha which, for the entire tool was 0.81 (Tab. 1). The original version of the research tool was purchased from the Psychological Tests Laboratory in Warsaw.

Table 1. Cronbach's alpha for the tool Health Behaviour Inventory (HBI)

Cronbach's alpha	Own results	Standardized results
Total	0.81	0.85
Positive mental attitude	0.75	0.65
Preventive behaviours	0.67	0.61
Proper eating habits	0.78	0.60
Health practices	0.61	0.64

A total of 517 students were enrolled into the final analysis – 253 (48.94%) from WUM, and 265 (51.06%) from CM UJK. The majority of respondents were females – 426 (82.40%), males – 91 (17.60), urban inhabitants – 390 (73.50) and rural inhabitants – 137 (26.50%) (Tab. 2).

Table 2. Characteristics of the study group

Socio-demographic variables	Medical University, Warsaw (WUM)	Collegium Medicum, Jan Kochanowski University, Kielce (CM UJK)
Age (M, SD)	20.77 (1.60)	22.40 (1.72)
Gender (n, %)		
Females	222 (87.75)	204(77.27)
Males	31(12.25)	60(22.73)
Place of residendce (n, %)		
Urban area <=50,000	44 (17.39)	39 (14.77)
Urban area > 50,000 <= 150,000	21 (8.30)	30 (11.36)
Urban area > 150,000 <= 500,000	13 (5.14)	92 (34.85)
City with population over 500,000	130 (51.38)	11 (4.17)
Rural area	45(17.79)	92(34.85)

Selection and assessment of variables for logistic regression model. Assessment of proper health behaviours of the examined students (dependent variable in the logistic regression model) was defined as a dichotomous variable created from standardized units (sten scale values 1–10). Results within the range 1–6 stens were defined as low and average, and coded by the value '0', whereas results from 7–10 as high, defined by the value '1'. Such a preparation of the variable allowed the construction of the first logistic model (M1), and explanatory variables were indicated by such variables as: gender, age, place of residence, and type of university.

The second logistic regression model (M2) allowed specification of factors which may predispose to the need for psychological support among the examined students (explanatory variable). For this purpose, a dichotomous variable was constructed, where value '1' defined the need for psychological support, while '0' the lack of such a need. The explanatory variables were: gender, age, place of residence, type of university, total number of scores obtained from the standardized HBI tool, frequency of individual statements specifying intensity of health promoting behaviours (point value) indicated by the respondents for positive mental attitude, preventive behaviours, proper eating habits, and health practices.

Table 3. Health behaviours according to the Health Behaviour Inventory (HBI) and type of university

Factors	Medical University, Warsaw (WUM)		Collegium Medicum, Jan Kochanowski University, Kielce (CM UJK)		p-value*
	Me (Q1-Q3)	min.-max	Me (Q1-Q3)	min.-max.	
Raw score HBI	77(69–84)	44–103	81(73–89)	42–116	<0.001**
Stens HBI	4 (3–6)	1–8	5 (4–6)	1–10	<0.001**
Positive mental attitude	19(16–22)	7–28	20(17–23)	8–30	0,009**
Preventive behaviours	20 (17–23)	9–30	21 (17–24)	9–30	0.043**
Proper eating habits	19 (16–22)	9–30	21(18–24)	9–30	0.001**
Health practices	19 (16–22)	7–27	19.5(16–22.5)	7–29	0.082

*Mann Whitney U test; ** p<alpha statistical significance observed; Me – median; Q1 – lower quartile; Q3 – upper quartile; min. – minimum value; max. – maximum value

Construction of the model was preceded by a preliminary selection of predictors through an assessment of their quality using Cramér's V coefficient. At that stage, a number of predictors were discarded. The remaining predictors were included in the sequential construction of the logistic regression model. To achieve this, forward stepwise regression was used, and the significance of the difference between the subsequent models constructed was evaluated using the Likelihood Ratio (LR) test. In the final step, another group of variables was discarded, as they proved to be insignificant. The remaining variables, however, were included in the final version of the model. The predictors' statistical significance was verified using the Wald test.

Statistical methods. Logistic regression was used to specify predictors exerting an effect on health behaviours and the respondents' need for psychological support. Goodness of fit of the model was investigated by means of the Hosmer–Lemeshow test (HL). In addition, an Receiver Operating Characteristc (ROC) curve was plotted to assess the consistency of satisfaction and dissatisfaction indications resulting from the model with the actual indications. The area under the ROC curve (AUC) was calculated, which is the measure of goodness of fit. The statistical value of goodness of fit for the HL test for the first model (M1) was equal 0.004, and the level of p=0.998 value, for the second model (M2), HL = 9.021, level of p=0.341 value, which evidences a significant fit of the logistic regression models (M1 and M2). Based on analysis of the area under the ROC curve, it may be stated that the models were well fitted to the data (areas under the ROC curve for M1 – AUC=0.803 (Fig. 1), while for the M2 – AUC=0.842 (Fig. 2), and is characterized by good predictive ability resulting from the obtained graphs of sensitivity and specificity for various levels of probability.

The comparison of distribution between individual dimensions of results of the standardized Health Behaviour Inventory (HBI) was performed using the non-parametric Mann-Whitney U test, considering the variable grouping the type of university. While seeking a relationship between the need for psychological support and the students' health behaviours, correlation analysis by non-parametric Spearman rho was applied. Independence of qualitative variables was investigated by the non-parametric χ^2 test.

In all statistical tests, the level of significance was set at α=0.05. Statistical analysis was performed using the software STATISTICA PL v. 13.1.

RESULTS

Health behaviours of students were compared using the standardized questionnaire Health Behaviour Inventory (HBI). In three dimensions: positive mental attitude (p=0.009), preventive behaviours (p=0.043), and proper eating habits (p=0.001), the distribution of the analyzed variables was diverse, which allowed the presumption that the factors determining health behaviours were higher among the students from the CM UJK. Health practices occurred to be statistically insignificant according to the type of university (p=0.082) (Tab. 3).

According to the interpretation of the results and according to the standardized tool, raw results were converted into the sten scale (1–10). Results within 1–6 stens were defined as low and average health behaviours, whereas 7–10 as high.

The variable. The variable defined in this way was analyzed according to gender, type of university, place of residence, and the need for psychological support. The frequency of occurrence of the specified health behaviour insignificantly differed statistically between males and females (p=0.603). Students from the CM UJK significantly more frequently showed high health behaviours, compared to those from the WUM (p=0.003). The type of health behaviour occurred to be statistically significantly dependent on the respondents' place of residence (p=0.022). Respondents with low and average health behaviours statistically more often showed the need for psychological support (p<0.001) (Tab. 4)

The first model of logistic regression (M1) was subsequently constructed seeking predictors which had the greatest effect on the occurrence of high heath behaviours. Based on the verification of the Wald statistic, statistically insignificant factors were the respondent's age (0=0.743), and gender (p=0.405).

The lowest odds of the occurrence of high health behaviours was observed among students living in an urban area with a population over 500,000, compared to those living in the remaining areas (OR=0.434; 95%Cl: 0.213–0.884; p=0.022), while this odd was nearly twice as high in students from the CM UJK (OR=1.704; 95%Cl: 1.041–2.790; p=0.034), compared to those studying at the WUM (Tab. 5).

It was found that every third respondent (178; 34.43%) indicated the need for psychological support. The subsequent stage of analysis attempted to determine the relationship between this parameter and individual factors of the standardized tool HBI, and age. A statistically significant relationship was found between the need for psychological support and low health behaviour in terms of students' positive mental attitude (r=-0.459; p<0.001) and health practices (r=-0.178; p<0.001) (Tab. 6).

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Table 4. Type of health behaviours according to selected factors

Variable	Low and average health behaviours (n=430)	High health behaviour (n=87)	Total (n=517)	p-value*
Gender				
Females	356 (82.79%)	70(80.46)	426(82.40)	0.603
Males	74(17.21)	17(19.54)	91(17.60)	
University				
WUM	223 (51.86)	30 (34.48)	253 (48.94)	0.003**
CMUJK	207 (48.14)	57 (65.52)	264 (51.06)	
Place of residence				
Urban area <=50,000	68 (15.81)	15 (17.24)	83 (16.05)	0.022**
Urban area > 50,000 <= 150,000	44 (10.23)	7 (8.05)	51 (9.86)	
Urban area > 150,000 <= 500,000	79 (18.37)	26 (29.89)	105(20.31)	
City with population over 500,000	128 (29.77)	13 (14.94)	141 (27.27)	
Urban area	111 (25.81)	26 (29.89)	137 (26.50)	
Need for psychological support				
No	264 (61.40)	75(86.21)	339 (65.57)	<0.001**
Yes	166(38,60)	12 (13.79)	178 (34.43)	

*chi 2 test; ** p<alpha statistical significance observed

Table 5. The first model (M1), factors exerting an effect on the occurrence of high health behaviours

Variable – reference variant	Assessment of logistic regression parameter	OR (95% Cl)	p-value
Intercept	-2.854	0.058(0.031–0.109)	<0.001
Place of residence with population over 500,000	-0.836	0.434(0.213–0.884)	0.022
University CM UJK	0.533	1.704(1.041–2.790)	0.034

OR- odds ratio; 95% Cl – confidence interval for OR

Table 6. Relationship between the need for psychological support indicated by the examined students and individual dimensions of the Health Behaviour Inventory (HBI)

Relationship between students' need for psychological support and	Spearman's rho	t(N-2)	p-value
HBI stens	-0.281	-6.6461	<0.001**
Positive mental attitude	-0.459	-11.7191	<0.001**
Preventive behaviours	-0.018	-0.4138	0.679
Proper eating habits	-0.066	-1.5054	0.133
Health practices	-0.178	-4.1180	<0.001**
Age	0.0183	0.4151	0.678
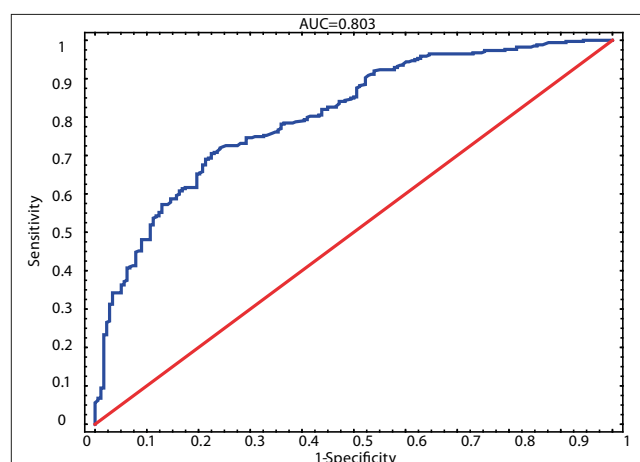
Figure 1. ROC curve for the first model (M1).

While determining factors exerting an effect on the need for psychological support (second model – M2) proper eating habits (p=0.989), health practices (p=0.337), and preventive behaviours (0.094) occurred to be statistically insignificant (verification using the Wald test). Students who declared the need for psychological support were characterized by low positive mental attitude (OR=0.785; 95%Cl: 0.739–0.834; p<0.001). Especially low results were obtained in the case of avoidance of excessively strong emotions, stressful situations, tension, feeling of anger, and lack of positive thinking. The chance for the need of psychological support increased twofold in students who felt lonely during the pandemic, which resulted from isolation and remoter classes (OR=1.964; 95%Cl: 1.622–2.378; p<0.001), compared to students who did not have such feelings, and increased with age (OR=1.270; 95%Cl: 1.106–1.458; p=0.001). In females, the need for psychological support was more than twice as high (OR=2.256; 95%Cl: 1.156–4.402; p=0.017), compared to males (Tab. 7).

DISCUSSION

Proper health behaviours, such as eating habits, health practices, preventive behaviours or positive mental attitude, undoubtedly have an effect on the maintenance of proper health condition. Health behaviours may play a greater or lesser role in minimizing the effects of stress. The COVID-19 pandemic became a special period which may have generated stress in almost every person [19, 20].

The results of the current study allow the presumption that among the examined students the lowest results were

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Table 7. Second model (M2) factors exerting an effect on the need for psychological support in the examined students

Variable – reference variant	Assessment of logistic regression parameter	OR (95% CI)	p-value
Intercept	-3.274	0.038(0.002–0.904)	0.004
Positive mental attitude	-0.242	0.785(0.739–0.834)	<0.001
Feeling of loneliness during the pandemic	0.675	1.964(1.622–2.378)	<0.001
University CMUJK	-1.328	0.265(0.157–0.446)	<0.001
Age of examined students	0.239	1.270(1.106–1.458)	0.001
Gender (female) of examined students	0.813	2.256(1.156–4.402)	0.017

OR- odds ratio; 95% CI – confidence interval for OR
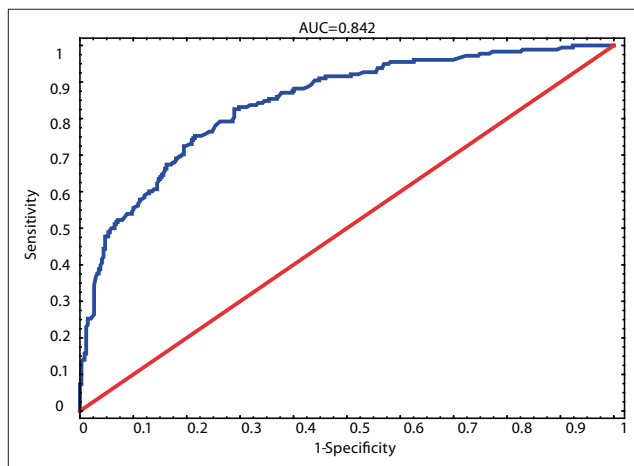
Figure 2. ROC curve for the second model (M2)

obtained in the area of health practices and positive mental attitude. High health behaviours were observed only in every fifth respondent. Badura-Brzoza K. et al. consider that, apart from the pandemic situation, the factors which may cause the highest level of stress among students of medical specialities are the lack of clinical experience, uncertainty about the future, and fear of expulsion from the university. The level of stress was higher among students who had just begun their education [19].

Different results were obtained in the study conducted in March 2021 by Ali S. et al., where the intensity of stress among final year students was considerably higher than among students in lower years [21]. It seems that persons who began their education in conditions marked by the COVID-19 pandemic were the group more exposed to experiencing stress, and had a negative mental attitude. At that time, most classes were held remotely, with only some practical classes were conducted on-site, which could have been one of the causes of the discussed behaviours. During that period, students had no possibilities to establish new relationships and maintain existing ones [19, 22].

Every third student indicated the need for psychological support, which had an important effect of their health behaviours. The respondents especially reported an increase in stress, and occurrence of depression and anxiety. The feeling of isolation during the COVID-19 pandemic undoubtedly exerted an effect on such behaviours. Researchers in China indicated that students who were obliged to quarantine or

isolate were at greater risk of occurrence of the symptoms of depression during lockdown, compared to students without such an experience [1].

The latest research draws attention to a high increase in the rates of depression and anxiety, and the frequency of these symptoms among students at the beginning of the pandemic [23, 24]. Moreover, studies conducted in the USA allowed the conclusion that improper health behaviours and mental health disorders documented at the beginning of the COVID-19 pandemic, persisted a year later [25]. The researchers indicated that females more often than males signalled the need for psychological support as the result of the COVID-19 pandemic. Studies by other researchers allowed the presumption that females are less resistant to stressful situations and anxiety, and in this group, depression was diagnosed more often. Simultaneously, it was noted that the sense of security and support from family and friends, were protective factors against anxiety. The family environment played a very important role in this area, especially in the situations of hindered access to specialist health care [10, 25].

Proper health behaviours developed in early adolescence may be the factor which has an effect on human mental health in later adult life. The chronic nature of the COVID-19 pandemic may be a potential source of long-term effects of stress, which may translate into an increased need for psychological support. It seems crucial to develop attitudes among medical students, making them aware of the importance of the profession as a certain type of pattern of conduct and an example for the society. Shaping health attitudes among students of medical specialities is beneficial not only for them, but also for the environment, in accordance with the normative scenario which defines three levels of rewards: personal, family and, in the broadest sense, community [19, 26].

CONCLUSIONS

1. The COVID-19 pandemic exerted a negative effect on the health behaviours of students of medical specialities, especially in the area of psychological health.
2. The need for psychological support declared by the examined students of medical specialties was associated with the deterioration of health behaviours, especially with the respondents' negative mental attitude, and negative health practices.
3. The degree of psychological support among the examined students of medical specialities differed according gender, age, feeling of loneliness, and mental attitude.
4. Students of medical specialities forming interpersonal teams of future patient care should particularly take care of their own psychological health, which translates into the quality of medical care.

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