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PERCEPTION OF THE EPIDEMIC RISKS OF THE COVID-19 PANDEMIC BY THE POPULATION OF UKRAINE

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Ключові слова: коронавірусна інфекція, епідемічні ризики, COVID-19, епідемічна настороженість населення, шкала оцінки епідемічної настороженості

Abstract. Perception of the epidemic risks of the COVID-19 pandemic by the population of Ukraine. Dorohan S.B., Shevchenko A.A., Kulagin A.A., Liashchenko O.V., Lobas V.M., Mikriukova N.G., Kostetsky I.V. In the social network Facebook from April 2020 to October 2020 an online survey using the "Google Form" was conducted to study the perception of the COVID-19 pandemic by the residents of Ukraine. The study involved 550 participants residing in the Ukraine-controlled territory and the city of Kyiv. The data are as follows: the coronavirus is considered a serious danger by 33.3±2.0% of respondents and 11.6±1.4% agree with certain doubts (in total – Σ44.9±2.1%); 21.1±1.7% believe that the coronavirus is not serious and 17.3±1.6% believe that it is probably not serious (Σ38.4±2.1%). COVID-19 is recognized as a pandemic by 73.6±1.9% of respondents, of them 45.6±2.1% of respondents completely agree with this statement. Different views towards the severity of the problem show little but reliable correlation with age ($r^s = 0,23$; $p < 0,001$), gender ($r^s = 0,21$; $p < 0,001$) of the respondents, as well as with the size of the locality where respondents live ($r^s = 0,30$; $p < 0,001$). It was revealed that men (47.2±3.6%), persons over 50 years of age (47.5±5.0%) and residents of small towns with a population of 3,000 to 10,000 residents (47.7±4.3%) are more skeptical about this issue. The majority of respondents have a moderate level of epidemiological vigilance – 299 (54.4±2.1%); this means that a person emphasizes the seriousness and real threats of coronavirus infection, perceives and adheres to the adopted measures, but with certain hesitations. A high level of epidemiological vigilance characterized by confidence in the real situation and the adopted measures is found in 119 (21.6±1.8%) respondents. A low level of epidemiological vigilance is in 121 (22.0±1.8%) respondents. Only 11 people (2.0±0.6%) have the overall sum of points, which indicates the absence of epidemiological vigilance.

Реферат. Сприйняття епідемічних ризиків пандемії COVID-19 населенням України. Дорогань С.Б., Шевченко О.А., Кулагін О.О., Лященко О.В., Лобас В.М., Мікрюкова Н.Г., Костецький І.В. Для вивчення сприйняття жителями України пандемії COVID-19 проведено інтернет-опитування з використанням «Google Form». Анкетування проводилося в соціальній мережі «Фейсбук» з квітня 2020 до жовтня 2020 року. У дослідженні взяли участь 550 осіб, які проживають на підконтрольній Україні території й місті Києві. Отримані такі дані: коронавірус вважають серйозною небезпечкою 33,3±2,0% опитаних і ще 11,6±1,4% з цим згодні з певними сумнівами (сумарно – Σ44,9±2,1%); 21,1±1,7% вважають, що коронавірус – це не серйозно, і 17,3±1,6% вважають, що це ймовірно несерйозно (Σ38,4±2,1%). Факт пандемії COVID-19 визнають 73,6±1,9% опитаних, з них повністю з цим згодні 45,6±2,1% респондентів. Різні погляди на серйозність проблеми слабо, але достовірно корелюють з віком ($r^s = 0,23$; $p < 0,001$), статтю ($r^s = 0,21$; $p < 0,001$) респондентів, а також з розмірами населеного пункту проживання опитаних ($r^s = 0,30$; $p < 0,001$). Установлено, що до реальності пандемії і пов'язаних з нею індивідуальних ризиків скептичніше ставляться чоловіки (47,2±3,6%), особи старше 50 років (47,5±5,0%) і жителі невеликих міст з населенням від 3 до 100 тис. (47,7±4,3%). Епідемічна настороженість у більшості опитаних відповідає середньому рівню – 299 (54,4±2,1%). Тобто людина усвідомлює серйозність і

реальні загрози коронавірусної інфекції, сприймає вжиті заходи і їх виконує, але з певними сумнівами. Високий рівень епідемічної настороженості, для якого характерні впевненість у реальності ситуації і введених заходах, відзначався в 119 (21,6±1,8%) респондентів. Низький рівень епіднастороженості мав 121 (22,0±1,8%) опитаний. Лише в 11 осіб (2,0±0,6%) сума балів відповідала рівню, який свідчить про відсутність епіднастороженості.

The first report of 44 cases of viral pneumonia caused by a previously unknown pathogen was sent to the WHO on December 31, 2019. On January 30, 2020, the WHO recognized COVID-19 as a global emergency and declared a global pandemic on March 11 [1]. However, these risks may differ for different countries, so based on the global risk assessment, each country must develop its own national assessment [3].

In addition to the existential threat, multiple complications, COVID-19 has psychological consequences. This is a situation of anticipation of illness, anxiety and concern for the health and lives of loved ones, relatives and friends. Change in lifestyle, established hygienic skills, self-isolation, numerous, unprecedented restrictions have a significant influence on the psycho-emotional state of people [11]. After the end of quarantine and self-isolation in China, Chinese scientists conducted a survey at one of the industrial enterprises (n=673, including workers and technical staff – 551, management – 122). At the same time, such conditions as depression, anxiety, stress, symptoms of post-traumatic stress disorder were revealed in workmen [13, 14].

Healthcare systems in Europe, built around the concept of patient-centeredness, were not ready for new challenges, as the epidemic required completely different approaches – Rodolfo Saracci – former President of the International Epidemiological Association (Lyon, France). We have learned painfully that we need public health professionals, epidemiologists. The health care system has proved to be without a strong preventive pillar in both Italy and most European countries [12, 15].

At present, we in Ukraine need to recognize that the adaptation of the national health care system to European standards must be gradual and well-founded. This also applies to the preventive link, which in the past was provided by the Sanitary and Epidemiological Service, and its analogues are successfully operating in EU countries, in particular in Poland [10].

Purpose of research – determining the structure of the subjective attitude of the citizens of Ukraine to the danger of coronavirus infection and developing a special scale to assess the level of epidemic vigilance of the population amid the pandemic COVID-19.

MATERIALS AND METHODS OF RESEARCH

In the social network Facebook from April 2020 to October 2020 an online survey using the "Google Form" was conducted to study the perception of the COVID-19 pandemic by the residents of Ukraine.

The questionnaire covered the entire territory of Ukraine. The methodology of the questionnaire was developed on the basis of the previously tested and patented "Methods for determining radio-related anxiety of the population", the monograph "Radio-related anxiety of the population" [9]. The authors confirm that sociological research (questionnaires) for the preparation of the article were conducted in accordance with the principles of bioethics set out in the Helsinki Declaration "Ethical Principles of Medical Research with Human Participation" and received a positive opinion of the DSMU Bioethics Commission (protocol No. 3 dated 16.02.2022).

The study involved 550 people from all regions controlled by Ukraine, the city of Kyiv and three foreign respondents – former citizens of Ukraine. The residents of Donetsk (21.5%), Kirovohrad (21.1%), Kyiv (9.8%), Dnipropetrovsk (9.3%) regions and the city of Kyiv (10.9%) were most active.

The age of the survey participants ranged from 16 to 73 years (average, $M \pm m = 34.9 \pm 0.6$ years). Among respondents, women (n=353 – 64.2%) and residents of the cities (n=449 – 81.6%) prevailed (Table 1).

The survey involved 188 (34.2%) students, 311 (56.5%) people in work, representatives of various activities and 51 (9.3%) permanently or temporarily inactive persons (Table 2). Two thirds of respondents (n=371 – 67.5%) had higher (master, specialist, bachelor), 95 (17.3%) – pre-higher, 82 (14.9%) – complete secondary education, including vocational, 2 (0.4%) – basic secondary education. According to the family status, almost half of the respondents were married (n=266 – 48.4%), 225 (40.9%) of individuals – unmarried, 59 (10.7%) – divorced or widowed.

In addition to the issues of general content, the questionnaire contained 8 specific questions regarding coronavirus infection, answers to which gave an idea of the perception of people of coronavirus infection, assessing of anti-epidemic measures and, in fact, their intentions as for the execution of regulations on public protection. Respondents had to choose one of 5 answer options: "exactly not", "probably not", "it is hard to say", "probably so" and "exactly yes". In order to obtain an integral assessment of the perception of epidemic risks (epidemic vigilance) regarding the indicated infection, all answers are estimated by a five-point scale (Table 3). Two more questions of the questionnaire concerned the influence of the coronavirus pandemic on the own business and the attitude of respondents to the elimination of the state sanitary and epidemic service in Ukraine.

Table 1

Distribution of respondents by age, gender, place of residence

Indicator		Abs./ %	Locality, number of residents	Abs./ %
Age, years	16-29	245/ 44,5	Village (to 500)	17/ 3,1
	30-39	111/ 20,2	Village, urban type village (501 - 3000)	46/ 8,4
	40-49	95/ 17,3	Small town (3001 - 10 000)	38/ 6,9
	50-59	67/ 12,2	City (10 001 - 100 000)	94/ 17,1
	60 and over	32/ 5,8	City (from 100 001)	186/ 33,8
Gender	men	197/ 35,8	City (from 500 000)	56/ 10,2
	women	363/ 64,2	City (more than 1 mln.)	113/ 20,5

Statistical processing of research materials was carried out using STATISTICA V.6.1 program package (AGAR909E415822FA serial number). Mean and relative values are presented as arithmetic mean (M) and frequency (f, %) with standard error ($\pm m$). Pearson's Chi-square test (χ^2) was used to compare relative values between groups; for average values –

analysis of variance ANOVA (F) with post hoc pairwise comparisons by the Tukey test (HSD test). The evaluation of the correlation interconnection between the qualitative attributes was carried out according to the coefficient of contingency (r^c) [2]. The critical level of statistical significance (p) in checking statistical hypotheses was ≤ 0.05 .

Table 2

Distribution of respondents by place of work, study

Job	Absolute number	%
Student, pupil	188	32,4
Office worker, specialist	79	14,4
Teacher, research worker	78	14,2
Manager, business owner	48	8,7
Medical worker	44	8,0
Service worker	26	4,7
Public officer	20	3,6
Pensioner	21	3,8
Unemployed	15	2,7
Person on maternity leave	15	2,7
Worker, farmer	8	1,5
Serviceman	8	1,5

Table 3

Questionnaire for defining of epidemic vigilance of population

Phrase	Weight of answers in points				
	exactly no	probably no	hard to say	probably yes	exactly yes
1. Coronavirus - it is not seriously	4	3	0	2	1
2. Coronavirus is pandemic. I perceive it like real threat	1	2	0	3	4
3. Measures implemented in the country are timely	1	2	0	3	4
4. Measures introduced are adequate	1	2	0	3	4
5. Quarantine is a right decision	1	2	0	3	4
6. Violation of quarantine is a crime	1	2	0	3	4
7. I adhere to self-isolation	1	2	0	3	4
8. "Spring is coming, bringing beauty - quarantine is not for me	4	3	0	2	1

RESULTS AND DISCUSSION

The main results of the survey of respondents regarding coronavirus infection are given in Table 4. Coronavirus is considered a serious danger by 33.3±2.0% and 11.6±1.4% of respondents with certain doubts agree with this (total – Σ 44.9±2.1%). But 21.1±1.7% of respondents believe that coronavirus – it is not seriously, 17.3±1.6% think that probably it is not seriously (Σ 38,4±2.1%). Pandemic COVID-19 is already recognized by 73.6±1.9% of respondents, of

which 45.6±2.1% of respondents agree with this. Different views on the severity of the problem poorly but are likely to correlate with age ($r^c=0.23$; $p<0.001$) and gender ($r^c=0.21$; $p<0.001$) of respondents, as well as with the number of people at a place of residence ($r^c=0.30$; $p<0.001$). Thus, men (47.2±3.6%), people aged over 50 (47.5±5.0%), residents of settlements and small cities with a population of 3,00 to 100,000 (47.7±4.3%) are more skeptical to the existence of real danger.

Table 4

Perception of pandemic COVID-19 by the citizens

Question	Answer				
	exactly no	probably no	hard to say	probably yes	exactly yes
	abs./ f±m%	abs./ f±m%	abs./ f±m%	abs./ f±m%	abs./ f±m%
1. Coronavirus - it is not seriously	183/ 33.3±2.0	64/ 11.6±1.4	92/ 16.7±1.6	95/ 17.3±1.6	116/ 21.1±1.7
2. Coronavirus is pandemic. I perceive it like real threat	29/ 5.3±1.0	59/ 10.7±1.3	57/ 10.4±1.3	154/ 28.0±1.9	251/ 45.6±2.1
3. Measures implemented in the country are timely	86/ 15.7±1.5	89/ 16.2±1.6	108/ 19.6±1.7	180/ 32.7±2.0	87/ 15.8±1.6
4. Measures introduced are adequate	71/ 12.9±1.4	99/ 18.0±1.6	108/ 19.6±1.7	185/ 33.7±2.0	87/ 15.8±1.6
5. Quarantine is a right decision	39/ 7.1±1.1	30/ 5.4±1.0	56/ 10.2±1.3	162/ 29.5±1.9	263/ 47.8±2.1
6. Violation of quarantine is a crime	55/ 10.0±1.3	67/ 12.2±1.4	98/ 17.8±1.6	151/ 27.4±1.9	179/ 32.6±2.0
7. I adhere to self-isolation	60/ 10.9±1.3	38/ 6.9±1.1	41/ 7.5±1.1	192/ 34.9±2.0	219/ 39.8±2.1
8. "Spring is coming, bringing beauty" - quarantine is not for me	258/ 46.9±2.1	128/ 23.3±1.8	84/ 15.3±1.5	58/ 10.5±1.3	22/ 4.0±0.8

Most respondents ($\Sigma 48.5 \pm 2.1\%$) recognize that measures taken in the country are timely, but almost a third of citizens ($\Sigma 31.9 \pm 2.0\%$) is sceptical about this. The measures implemented are considered not adequate by less than a third of respondents ($\Sigma 30.9 \pm 2.0\%$), 15.8 \pm 1.6% of respondents fully support the acts of state power, and 33.7 \pm 2.0% – support half-way. Untimely measures taken are mentioned by the individuals over 60 (40.6 \pm 8.7%) as well as by servicemen (62.5 \pm 17.1%). This, in our opinion, may be due to the known age peculiarities of older people to percept modernity ("once everything was better, now – not so") [4]. At the same time, servicemen are intrinsic to a professional habit of executive discipline, punctuality and evaluation of the result of the paradigm "late – lost".

Mostly medical workers (43.2 \pm 7.5%), business owners and office workers (40.2 \pm 4.4%), especially at the age of 40-49 (44.2 \pm 5.1%), as well as residents of large cities (38.1 \pm 4.6%), recognize that acts of power are inadequate. If in the first category, this may be associated with professional awareness and own hard experience of organizing and providing medical care to the COVID-19 patients, many people of active age – small business owners, office workers in large cities due to strict quarantine events suffered either financial losses, or were forced to adapt to the "distance" work.

Almost half of respondents (47.8 \pm 2.1%) fully supports the introduction of quarantine, 29.5 \pm 1.9% believe that quarantine is probably a true solution ($\Sigma 77.3 \pm 1.8\%$). Respondents from the Southern (Odessa, Mykolaiv, Kherson) regions of Ukraine (91.7 \pm 5.6%) and persons of the age category 60+ (87.5 \pm 5.8%) expressed the greatest support of this measure, the smallest – residents of the Western (Volyn, Transcarpathia, Rivne) regions (52.4 \pm 10.9%), the city of Kyiv (65.0 \pm 6.2%) and Kyiv region (72.2 \pm 6.1%), chiefly – residents of large cities (71.7 \pm 4.2%) and people in work (73.6 \pm 2.5%). According to our observations, there is also an obvious connection between the attitude towards quarantine restrictions and the degree of business activity of the population of different regions and age groups, since quarantine significantly limited the usual rhythm of life of some individuals and almost did not affect others. In particular, the quarantine restrictions are perceived more negatively by people in areas with high labor migration. One of the reasons for complete support of quarantine in the Southern regions of Ukraine may be "historical memory" of the local people concerning the outbreak of cholera in Odessa in 1970 and the success of the severe containment and observational measures taken [8].

More than half of respondents (60.0 \pm 2.1%) believe that stay-home regime violation is a crime, but every fifth (22.2 \pm 1.8%) takes this preventive measure lightly.

The majority of respondents keeps to to self-isolation ($\Sigma 74.7 \pm 1.9\%$) and quarantine restrictions ($\Sigma 70.2 \pm 2.0\%$). This closely correlates ($p < 0.001$) with respondents' assessment of the seriousness of danger of coronavirus infection ($r^c = 0.32$ and $r^c = 0.42$ in accordance with mentined questions 7 and 8) and its real threat ($r^c = 0.44$ and $r^c = 0.48$), adequacy of implemented measures ($r^c = 0.32$ and $r^c = 0.27$) and the introduction of quarantine ($r^c = 0.42$ and $r^c = 0.49$).

For appreciable number of citizens (23.1 \pm 1.8%), the coronavirus pandemic became a destruction of business. Moreover, this percentage is higher among the inhabitants of the rural areas (33.7 \pm 4.7%) and persons with the secondary vocational and pre-higher education (30.6 \pm 4.4%). It should be assumed that it was in small cities that these segments of population were engaged in small business (sole proprietors, private enterprises), which mainly did not have a significant financial backstop in case of difficult times [5].

Despite the unfair attitude to the activity of the sanitary and epidemic service in previous years, it can be argued that the public opinion is currently changing. Most of the respondents (54.4 \pm 2.1%) are convinced that the elimination of the sanitary service does not correspond to the interests of society, 11.8 \pm 1.4% of the ones tend to believe that. Only 12.4 \pm 1.4% of respondents wholly or partially deny this fact. Other 21.4 \pm 1.8% of respondents, mostly young people under the age of 40 were not able to answer the question.

Consequently, the results of the online survey showed that more than half of Ukrainian residents quite objectively assessed the danger of coronavirus infection, quarantine restrictions and elementary anti-epidemic measures which were adopted by the authorities, and were ready to adhere to these measures.

In order to obtain an integral assessment of the perception of epidemic risks - the level of epidemic vigilance regarding coronavirus infection, respondents' responses for 8 questions of the survey were evaluated by a five-point scale (see Table 3). The level of epidemic vigilance of a particular person was set by the sum of the points received. Analysis of the distribution of total score of perception of epidemic risks in all respondents allowed to classify a sample into groups with absent (missing), low, moderate and high level of epidemic vigilance (Table 5).

According to our research it has been established that in most respondents epidemic vigilance corresponds to a moderate level – 299 (54.4 \pm 2.1%) (Fig.). That is, a person mostly recognizes the seriousness

and real threats of coronavirus infection, supports the measures taken and adheres to them, but only "at opportunity". This almost corresponds to the number of citizens (48.2±1.1%), ready for vaccination as of end of May 2021 [7]. A high level of epidemic vigilance, which is characterized by the compliance with the real situation and implemented measures was noted in 119

(21.6±1.8%) of respondents. A low level was noted in 121 (22.0±1.8%) of respondents. Only in 11 people (2.0±0.6%) the total score corresponded to the level indicating the absence of epidemic vigilance. In general, taking into account the scale proposed by us, the epidemic vigilance of the population is similar to the Gaussian curve (normal distribution of probabilities).

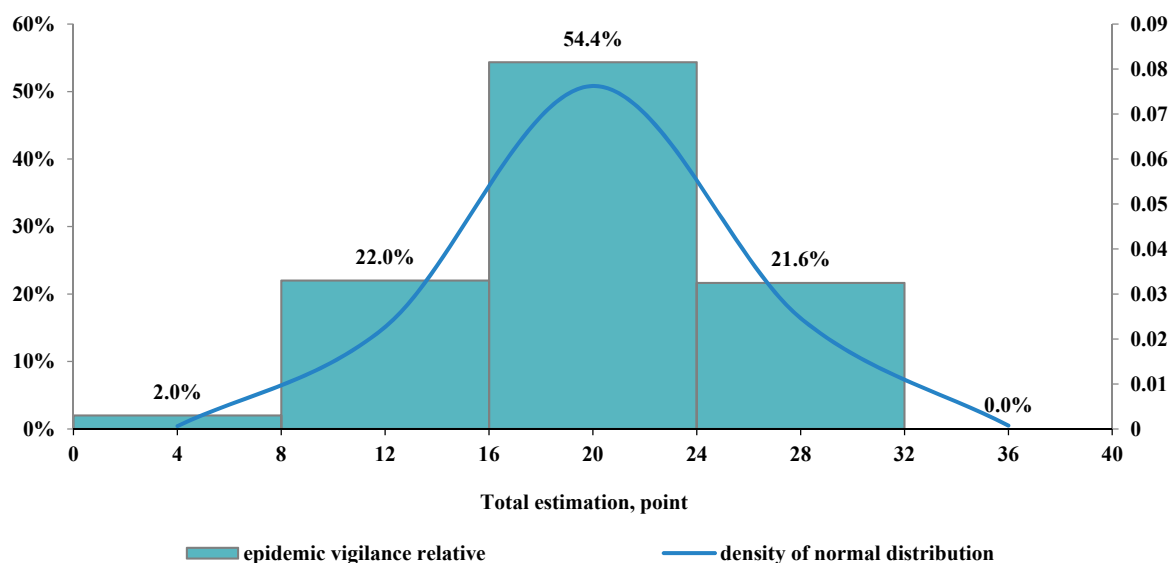
Table 5

Scale of epidemic vigilance assessment by population

Level of epidemic vigilance	Characteristics	Points
Epidemic vigilance is absent	a person considers that the coronavirus is not serious, does not perceive a pandemic as a real threat, considers senseless the measures taken to prevent coronavirus infection, including quarantine, strongly against self-isolation and the introduction of other individual and social restrictive rules of behavior	0-8
Epidemic vigilance is low	a person doubts that the coronavirus is serious, and the pandemic is a real threat, not sure about the appropriateness of anti-epidemic measures to prevent coronavirus infection, including the need for quarantine, does not understand the need for self-isolation and other restrictive individual and social rules of behavior	9-16
Epidemic vigilance is moderate	a person believes, with some reservations, that the coronavirus is serious and that the pandemic is a real threat, neither likes nor dislikes the measures taken to prevent coronavirus infection, is forced, but still accepts quarantine, ready, but only on occasion, to adhere to self-isolation and other restrictive rules of individual and social behavior	17-24
Epidemic vigilance is high	a person is absolutely convinced that the coronavirus is serious, perceives the pandemic as a real threat, considers it appropriate to take measures to prevent coronavirus infection, unequivocally supports the need for quarantine and strictly adheres to the restrictive rules of individual and social behavior	25-32

In general, the average of the total estimation of perception of epidemic vigilance relative to coronavirus infection ($M \pm m$) was 20.1 ± 0.2 points. It is determined that a moderate degree of expressiveness of the epidemic vigilance in women and men – 20.0 ± 0.3 and 20.4 ± 0.4 points, without significant differences ($p=0.310$ by ANOVA), but it depended on

the age of respondents ($p=0.008$). In particular, the lowest level of epidemic vigilance was observed in the category of people aged 30-39 years – 18.9 ± 0.5 points, and the highest – in persons aged 40-49 and over 60 years – 20.9 ± 0.5 points and 22.3 ± 0.8 points ($p=0.046$ and $p=0.013$ by criterion HSD).



Histogram of levels of epidemic vigilance of coronavirus infection in citizens of Ukraine

To determine the socio-psychological factors associated with occupational stress in health workers during the COVID-19 pandemic, a similar survey was conducted in the spring of 2020 [6]. The authors also did not find statistically significant differences between groups on all socio-demographic indicators, except the age of respondents. That is, in COVID-19, only the age factor had an effect on anxiety and fear ($p < 0.05$).

CONCLUSIONS

1. The structure of the subjective attitude of citizens of Ukraine to the danger of coronavirus infection 18 months after the announcement of pandemic is similar to the law of the normal distribution of Gauss probabilities, since most of the respondents ($54.4 \pm 2.1\%$) has a "moderate" level of epidemic vigilance, and the levels – "low" and "high" practically reflect each other and make up $22.0 \pm 1.8\%$ and $21.6 \pm 1.8\%$ respectively. It is noteworthy that the percentage of people with a "moderate" level of epidemic vigilance is very close to the number of citizens who are ready for COVID-19 vaccination. Only very small percentage of respondents – $2.0 \pm 0.6\%$ are COVID-skeptics, they do not perceive the pandemic as a threat and categorically against the introduction of restrictive rules of individual and social behavior in the country.

2. Against the background of social shocks, which can include pandemic, usually there is a stratification of public opinion concerning the effectiveness of acts of power. In our investigation it was found that most respondents ($48.5 \pm 2.1\%$) recognize the measures taken in the country as timely. Along with this, almost a third of citizens ($31.9 \pm 2.0\%$) are skeptical as to the efficiency of the actions of the authorities, and other $30.9 \pm 2.0\%$ of respondents consider implemented

measures to be not adequate (non-effective). Only $15.8 \pm 1.6\%$ of respondents fully support the acts of power, and $33.7 \pm 2.0\%$ – support partially.

3. The conducted survey showed a tendency between the attitude towards quarantine restrictions and the degree of business activity of the population of different regions and age groups, as quarantine significantly limited the usual rhythm of life of some and almost did not affect others. The least support of quarantine restrictions is among the population of the Western regions with high labor migration – Volyn, Transcarpathia, Rivne ($52.4 \pm 10.9\%$), the city of Kyiv ($65.0 \pm 6.2\%$) and Kyiv region ($72.2 \pm 6.1\%$), as well as residents of large cities ($71.7 \pm 4.2\%$) and people in work ($73.6 \pm 2.5\%$).

4. Based on the data obtained in this study, the score of epidemic vigilance of the population, which has four degrees ("absent", "low", "moderate", "high") has been proposed with the corresponding characteristics and evaluation in points. In the future, this may be the basis for the development and substantiation of the complex of administrative, organizational and medical (prophylactic and rehabilitation) measures in unfavorable epidemic conditions.

Contributors:

Dorohan` S.B. – methodology, investigation, writing – original draft, formal analysis;

Shevchenko O.A. – conceptualization, project administration;

Kulagin O.O., Liashchenko O.V. – visualization;

Lobas V.M., Mikriukova N.G., Kostetsky I.V. – formal analysis, resources.

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