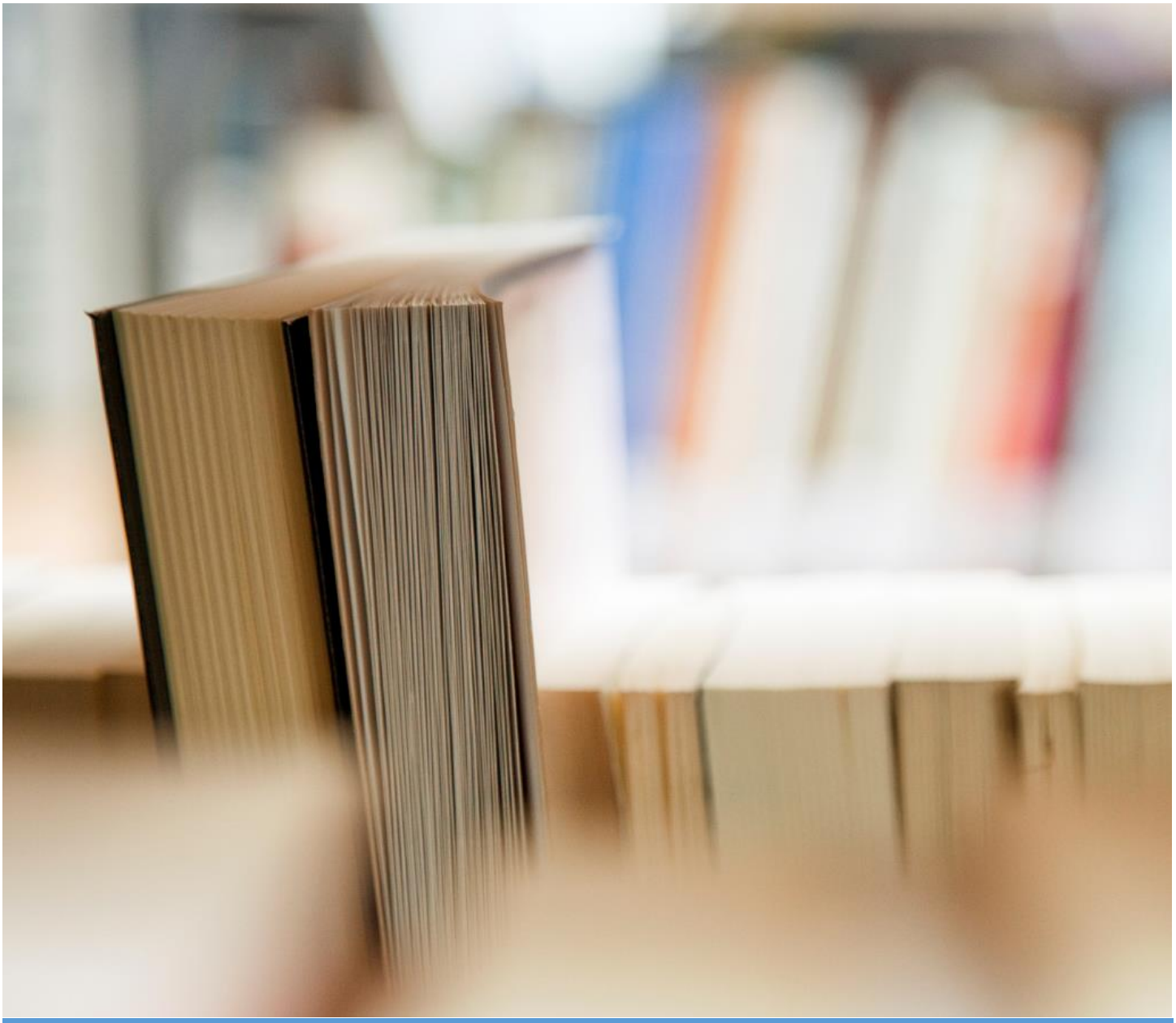

RISK COMMUNICATION CAMPAIGN IN ARMENIA AND ITS IMPACT ON THE COVID-19 PANDEMIC

Research results

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RISK COMMUNICATION CAMPAIGN IN ARMENIA AND ITS IMPACT ON THE COVID-19 PANDEMIC

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Executive summary

Background. The novel coronavirus disease (COVID-19), associated with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and officially declared as pandemic by WHO on March 11, 2020, is an unprecedented occurrence in our recent history. An effective risk communication that encompasses risk perception and measures to minimize it, is imperative in combating the spread of the outbreak. The study aimed to identify the major gaps in risk communication campaign in Armenia and to suggest strategies for strengthening coordinated and sustainable risk communication process against COVID-19 pandemic.

Methods: The case-control study was conducted to evaluate the effectiveness of the risk communication campaign in Armenia and explore the main differences in public's behavior that put certain groups of people at higher risk of infection. The number of recruited cases (people with confirmed COVID-19) and controls (people without confirmed COVID-19) was respectively 123 and 121. To explore RA population COVID-19 risk perceptions, satisfaction with provided information and recommendations, trust, acceptance of restrictions, behaviors, as well as its adherence to safety guidelines, including vaccination, statistical tool "Rapid, simple, flexible behavioral insights on COVID-19" issued by the WHO was used. It was translated, adapted for local circumstances and approved by the Ethics committee of the Yerevan State Medical University after M.Heratsi.

Results:
The majority of study participants in both compared groups felt they had moderate access to the COVID-19 information, and are able to understand and use it to some extent, but there was an issue with the ability to evaluate the credibility of the information in media. Medical personnel and social networks were considered accordingly the most trustworthy and the most untrustworthy sources of information in both compared groups.
The controls were significantly more confident about their awareness of COVID-19 preventive measures and ability to avoid the infection compared to cases. Higher awareness of controls about effective preventive measures contributed to the more frequent implementation of some of them by controls compared to cases. The cases have higher level of COVID-19-related stress and panic compared to controls.
Controls were more inclined to believe that politicians usually do not tell citizens the true motives of their COVID-19-related decisions. There was moderate correlation between the believes in COVID-19 conspiracy theories and the attitude to COVID-19 vaccination.
Both compared groups showed moderately positive attitude to the COVID-19-related restrictions. The most negative attitude among all restriction was toward mandatory COVID-19 vaccination in both compared groups. At the same time, the majority of cases and controls were ready to be vaccinated or were already vaccinated (67.3% and 76.1%, respectively). The cases were more likely than the controls to take into account the risk of getting infected when making vaccination decisions.
The logistic regression analysis showed that of all significant variables only younger age (OR= 1.046; 95% CI= 1.026-1.066) and preparedness and perceived self-efficacy (OR= 0.815; 95% CI= 0.713-0.930) were found to be associated with reduced risk of getting infected with COVID-19.
Conclusion: The study showed that the risk communication campaign by healthcare authorities during the COVID-19 pandemic has increase in some extent the awareness among the population in Republic of Armenia, where the overwhelming majority placed high trust in the medical personnel, and its main reference for COVID-19 information.
Keywords: COVID-19, pandemic, preparedness, response, risk communication

Introduction

The novel coronavirus disease (COVID-19), associated with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), drew the attention of the World in early January 2020. The World Health Organization (WHO) officially declared it a pandemic on March 11, 2020 [1]. As of March 9, 2022, there were almost 400 million confirmed cases and over six million deaths globally and those numbers are increasing on a daily basis

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[2]. More than two years COVID-19 pandemic is at the focus of attention of world health systems, policymakers, scientists, media, population, causing panic, psychological distress and fear. The unprecedented non-pharmaceutical interventions have been used worldwide including complete or partial lockdowns, travel restrictions, enforcing masks policy, social distancing, hands sanitization to restrain pandemic and reduce social overburdening by the disease and its mortality [3,4,5]. The safe and effective COVID-19 vaccines have been suggested during the last year as the most effective alternative to manage the pandemic. The undertaken interventions, including public vaccination allowed in several countries to slow down the progression of the disease. However, the risk of spreading the virus is still high given that new more transmissible strains of virus are developed and very often people, particularly in younger age groups, refuse to comply with public health measures, including vaccination aimed at curbing the spread of the disease.

The COVID-19 pandemic was placing an overwhelming burden on health systems and authorities to respond with effective and appropriate interventions, policies and messages. A poorly timed and managed pandemic response or transition phase can threaten the gains collectively achieved. The pandemic and its restrictions may have affected mental and physical well-being, social cohesion, economic stability as well as individual and community resilience and trust [6-13].

In such a situation it is very important for government and health officials not just provide people with reliable and up-to-date information but also achieve proper and effective risk communication.

Risk communication, as defined by the World Health Organization is “the exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being” [14].

The importance of risk communication has never been demonstrated more vividly than during the current COVID-19 crisis. As the WHO has stated, one of the major lessons learnt from the major public health events of the 21st century is that “risk communication and community engagement (RCCE) is integral to the success of responses to health emergencies” [15].

Production, transmission, and spread of the information related to COVID-19 and suggested vaccines are accompanied by remarkable rumors and misinformation [16]. Misinformation disrupts people’s perception of risk and diverts community from understanding the original risk, because risk perception is a main driving factor in how people react and adhere to safety guidelines and public health measures [17,18]. There are a lot of factors that can influence public risk perception. The most effective among them is risk communication message. It has been shown that ineffective or overwhelming risk messages are associated with either exaggerated or underestimated risk perception during the COVID-19 pandemic [19]. According to the results of the survey that gathered data from 58 countries during the early phase of the COVID-19 pandemic, cultural values and behavior, as well as high level of uncertainties also play crucial role in risk perception among the general population [20]. Therefore, all these findings highlighted the influence of effective communications on population behavior during the COVID-19 pandemic.

An effective risk communication that encompasses risk perception and measures to minimize it, can improve population perception of the benefits of preventive measures and adjust the public's behavior to cope with the risk proactively [21]. Whereas, ineffective risk communication and unreliability situations could lead to consequences, such as the loss of trust and reputation, socioeconomic effects, psychological effects, and, in worst case scenarios, loss of lives [22].
The best risk communication practices involve building and preserving public trust, announcing an outbreak early, communicating with the public in a truthful manner, respecting the public's concerns, and planning for an outbreak in advance [23,24,25].

Situation in Republic of Armenia

To date, Armenia like many countries around the world has already experienced several waves of the COVID-19 epidemic. The first COVID-19 case have been detected in RA at the beginning of March, 2020. The RA government declared the state of emergency and lockdown, which, unfortunately, was not as effective as in other countries because already in mid-April, the restrictions were gradually eased and by mid-May, all sectors of the Armenian economy were reopened. As a result, during the next months the number of new coronavirus cases rose steadily. Since June 3, 2020 mask wearing was announced mandatory in all (open and closed) public areas and in the late summer the country was able to flatten the COVID-19 curve. The second wave of the outbreak coincided with the escalation of the war in Nagorno Karabakh in autumn-winter period. The RA healthcare system was dangerously overstretched as it dealt with COVID-19 cases and refugees and soldiers wounded in Nagorno-Karabakh. Since spring, 2021 the pandemic wave has subsided with the lowest number of daily cases registered since the beginning of the epidemic.
Since the beginning of the COVID-19 epidemic in Armenia the public have sought clear and consistent information about its risk and major preventive measures. It was not easy for the RA government at the beginning of the pandemic to provide population with such guidance because there were many unknowns and uncertainties. The RA government and health officials stuttered at the start of the pandemic and were slow to provide clarity and certainty. The official messages sometimes were contradictory and people turned to alternative sources of information from social media which very often were unreliable and misleading. The failed risk communication process contributed to reduced trust in the sources of information and ability of the government to manage the outbreak, ultimately manifesting as inadequate risk perception and non-compliance to preventive recommendations which in some cases were given without taking into consideration the socio-cultural peculiarities of the population. This resulted in higher prevalence and cause-specific mortality rates in Armenia compared to not only European but also even neighbor countries.
Population surveys can explore public's risk perceptions, trust, knowledge, acceptance of restrictions, mental and physical health, behaviors, information needs, misperceptions and other variables. Understanding how, why and the context in which humans and communities respond to COVID-19 pandemic allows to anticipate unwanted scenarios and initiate mitigating measures; and implement pandemic response measures that are better informed, situated, accepted and thus more effective.

The launched research will allow to identify the major problems responsible for the ineffective risk communication campaign in Armenia and develop strategies for strengthening coordinated and sustainable risk communication process against COVID-19 pandemic.

Methodology

The main research question stated to achieve the goal of the study was as follows:
How effective was COVID-19 risk communication campaign in Armenia and what are the major directions for the strengthening of national risk communication program**?**
Sub-questions:
-What are the main gaps that need to be filled in order to improve public health understanding and outbreak response?
-Are there any differences in human behavior that puts certain group of people at higher risk of infection?
-What are the most effective communication activities?
-What policies would be necessary to strengthen the Armenian risk communication campaign?

Study design

In order to evaluate the effectiveness of the risk communication campaign and COVID-19 public health measures in Armenia, to characterize and assess the risk factors for SARS-CoV-2 infection in RA residents, a case-control study was conducted among the residents of Armenia aged 18 to 80 years. The case and control groups involved patients who had been and had not been infected with SARS-CoV-2, respectively. The case-control design had chosen to explore the main differences in human behavior that put certain groups of people at higher risk of infection.

Study setting

The study was conducted in 4 specialized hospitals of Yerevan and regions serving patients with COVID-19, as well as among randomly selected individuals who have not infected with COVID-19.

Study participants

The residents of Armenia with confirmed and not confirmed COVID-19 in age group 18-to 80 years with the willingness to participate in the survey were recruited as cases from the list of patients treated in 4 specialized hospitals. The residents of RA with the same eligibility criteria, except the presence of COVID-19 in anamnesis, were randomly recruited as controls during the period from January 7- to February 7.

Research instrument

To explore RA population COVID-19 risk perceptions, satisfaction with provided information and recommendations, trust, acceptance of restrictions, behaviors, as well as its adherence to safety guidelines, including vaccination, statistical tool “Rapid, simple, flexible behavioral insights on COVID-19” issued by the World Health Organization (WHO, 2020) was used [26]. The main

advantage of the selected tool is that it is flexible to adjust to the changing situation. The questionnaire was translated to Armenian by the expert translator familiar with terminology of COVID-19 and behavioral science and with interview skills, adapted to the local circumstances and questions regarded vaccination added. It was reviewed by two national peer reviewers and revised accordingly. Reviewers endorsed the final questionnaire upon revision. The questionnaire was pretested with a sample of respondents with a focus on their easy understanding of the questions before broad use. The tool was approved by the Ethical Committee of the Yerevan State Medical University after M.Heratsi on 25 November 2021 N4/3. The 15-20 minutes questionnaires were filled in by study participants.

The answers recorded by the questionnaire were transformed into the following dimensions: Socio-demography, COVID-19 personal experience, Health literacy, COVID-19 risk perception: Probability and Severity, Preparedness and Perceived self-efficacy, Prevention – own behaviors, Affect, Trust in sources of information, Frequency of Information, Conspiracies, Resilience, Fairness, Restrictions, Unwanted behavior, COVID-19 vaccine, Vaccination factors.

The dimensions were considered as numerical variables and presented by means, standard deviations and modes. The mean and standard deviation values were calculated for each dimension and item, mode – for each item. The modes showed the most common response to each statement while the mean gave us the overall average response.

1) Socio-demographic characteristics, "COVID-19 personal experience" and "Unwanted behavior" dimensions' variables were analyzed as categorical variables.
2) "Health literacy" dimension allowed to assess how easy was for study participants to find information on COVID-19 symptoms, find out what to do if infected, judge reliability of information, follow recommendations, decide on prevention behavior.
3) "COVID-19 risk perception: Probability and Severity" dimension allowed to identify possible patterns in behaviors related to risk perception.
4) "Preparedness and Perceived self-efficacy" allowed to identify possible patterns in behaviors/perceptions related to self-efficacy.
5) Knowledge of prevention and own prevention behaviors were compared using the "Prevention-own behaviors" dimension.
6) "Affect" dimension allowed to assess mental health implications of COVID-19 restriction – ultimately potentially as a warning sign that restrictions need to be changed.
7) "Trust in sources of information" dimension allowed to identify trusted information sources, to be used for planning communications.
8) "Frequency of information" was used to explore information needs, to be used for planning communications.
9) "Conspiracies" dimension allowed to study perceptions related to transparency, motivations, monitoring, secrets, hidden organizations, to detect trends in possible conspiracy theories which may need to be addressed.
10) "Resilience" dimension allowed to explore public's perceptions related to coping with stress, to identify mental health implications of restriction.
11) "Fairness" dimension is considered to assess perceptions related to the fairness of COVID-19 decisions.

12) "Restrictions" dimension is considered to assess public's perceptions related to COVID-19 restrictions (adapted to country decisions made/considered).
13) "Unwanted behavior" dimension included questions about reported own behavior (discrimination, physical exercise, alcohol, diet, smoking, vaccination postponed, drugs against COVID-19, postponed doctor visit), allowed to identify adverse behaviors that may need to be addressed.
14) "COVID-19 vaccine" dimension allowed to explore public's barriers/drivers to getting the vaccine (production country, recommendations, many vaccinated, free of charge, ease of access, used in other countries, COVID-19 risk, need if others are vaccinated).
15) "Vaccination factors" dimension allowed to determine the major factors influencing the public's willingness to get vaccinated.

All the dimensions, except "Socio-demography", "COVID-19 personal experience", and "Unwanted behavior", consist of 7-point Likert-scaled items. The used scale offered 7 different answer options related to an agreement that was distinct enough for the respondents to answer without getting confused. It gave a better reflection of a respondent's true evaluation. It was a continuum from lowest to highest points and had two moderate opinions along with two extremes, two intermediate, and one neutral. Each response was assigned to a point value from 1 to 7. Values started with the lowest options at 1 point and the highest at 7. The assessment was conducted for each dimension based on the scoring system presented in Table 1.

Table 1. Scoring of 7-point Likert-scaled items by dimensions.

Dimensions	Sum of items	Possible range of raw score (Min, Max)
Health literacy	7	7-49
COVID-19 risk perception: Probability and Severity	2	2-14
Preparedness and Perceived self-efficacy	2	2-14
Prevention-own behaviors	9	9-63
Affect	7	7-49
Trust in sources of information	9	9-63
Frequency of information	1	1-7
Conspiracies (perceptions)	5	5-35
Resilience (perceptions)	1	1-7
Fairness (perceptions)	2	2-14
Restrictions	10	10-70
Covid-19 vaccine	6	6-42
Vaccination factors	9	9-63

Sample size

For the sample size calculation, the formula for case-control study was used:

$$N = (r+1)/r * ((p * q * (Z\alpha/2 + Z\beta)2/ (p1 - p2)2),$$

where Zα/2 = 1.96, Zβ = 0.84; r- the ratio of "cases" and "controls" samples sizes, equal to 1; p1 և p2 – the percentage of people with high awareness about COVID-19 preventive measures among cases and controls; q1 և q2 - the percentage of people with low awareness about COVID-19 preventive measures among cases and controls; p= p1 + p2 /2, q= q1 + q2 /2.
The targeted sample size was estimated to be 110 for cases and controls. Adjusting for the projected 10% attrition, the final sample sizes estimated for each group was at least 121 participants. By the end of the study, 123 cases and 121 controls were enrolled in the study.

Data analysis

After data collection, the processing and analysis was performed using SPSS-16 software package. Patient characteristics are reported in terms of measures of central tendency and proportions. Knowledge, awareness, risk behavior, and illness perception of COVID-19 are reported descriptively. T-test for independent samples, chi-square test and correlation analysis were used for statistical inference.

Multivariate logistic regression analysis was performed to evaluate the association of various variables with the risk of getting infected with COVID-19, displayed as odds ratios, OR with 95% confidence intervals.

Ethical issues

The study was observational with voluntary participation and expected low risk for participants. Potential risks identified include only the inconvenience of the time taken to respond to the survey. Due to strict data protection measures, any risk related to non-anonymous publishing of data from the survey is considered very low, and the personal harm for the individual respondent related to such unlikely event is also considered low due to the less sensitive nature of the responses provided. Benefits include the sense of contributing and being able to participate in shaping the country's pandemic response. The study's protocol was approved by the YSMU Ethical Review Committee prior to the initiation of the data collection process.

Results

The number of surveyed cases and controls was respectively 123 (50.4%) and 121 (49.6%). The study of socio-demographic characteristics of the study participants allowed to stratify findings per infected/not infected persons. The average age of participants in the group of cases was 52.1 (SD=17.06), in the group of controls - 39.0 (SD=15.01), and the difference was statistically significant (t= 6.255, p=0.000).
Table 2 summarizes the distribution of cases and controls by socio-demographic characteristics. As presented in the table controls were 1.7 times more likely than controls to have completed university. Cases and controls did not differ significantly in gender and presence of medical

background. The percentage of those who lived in urban areas was statistically significantly higher among controls compared to cases. Cases were more likely to have chronic diseases compared to controls. The percentage of people who lived with children under 18 or family members in COVID-19 risk groups was statistically significantly higher among cases compared to controls.

Table 2. Socio-demographic characteristics of the cases and controls.

Characteristics	Cases		Controls		Chi-square, p-value
	No	%	No	%	
Gender					
Male	35	28.5	44	36.4	chi-square =1.520,
Female	88	71.5	77	63.6	p>0.05
Education					
Elementary	4	3.3	8	6.6	chi-square =23.330,
Secondary	69	56.1	32	26.4	p=0.000
Higher	48	39.0	81	67.0	
Did not answer	2	1.6	0	0.0	
Medical background					
Yes	28	22.8	30	24.8	chi-square =0.024,
No	88	71.5	90	74.4	p>0.05
Did not answer	7	5.7	1	0.8	
Place of living					
Urban are	90	73.2	113	93.4	chi-square =16.525,
Rural area	29	23.6	8	6.6	p=0.001
Did not answer	4	3.2	0	0.0	
Presence of chronic disease					
Yes	53	43.1	31	25.6	chi-square =10.105,
No	63	51.2	87	71.9	p=0.006
Did not know	5	4.1	3	2.5	
Did not answer	2	1.6	0	0.0	
Family members					
Lived alone	11	8.9	14	11.6	chi-square =10.415,
With children under 18	37	30.1	22	18.2	p=0.015
With members in COVID-19 risk group	31	25.2	21	17.4	
None of the above	36	29.3	59	48.8	
Did not answer	8	6.5	5	4.0	

It is interesting to mention that among patients with diagnosed COVID-19 who were treated in hospitals, only 76.2% agreed that they got infected with COVID-19, 21.3% denied it and 2.5% found it difficult to answer.

Half of the patients among cases (50.5%) had moderate form of COVID-19, 37.6%- mild form and 11.9%- severe form. COVID-19 PCR test was positive in overwhelming majority of cases (77.0%), in 20.4% it was negative, and the rest 2.6% of patients did not have information about it.

The percentages of those who were aware of people in their immediate social environment who got infected with COVID-19, as well as died from the disease, were statistically significantly higher among controls compared to cases (Table 3).

Table 3. Awareness of study participants of people got infected and died from COVID-19.

Variables	%		Chi-square, p-value
	Cases	Control	
Awareness about people in the immediate social environment who had been infected with COVID-19			
Aware	75.2	90.5	Chi-square=11.957, p=0.008
Unaware	21.5	7.8	
Found difficult to answer	3.3	1.7	
Awareness about people who died from COVID-19			
Aware	66.4	81.2	Chi-square=10.175, p=0.038
Unaware	27.7	14.5	
Found difficult to answer	5.9	4.3	

All the subsequent results related to the study participants risk perception, knowledge, trusted sources of information, attitudes toward pandemic response initiatives and other variables to inform COVID-19 outbreak response measures, including policies, interventions and communications. Summary scores and average scores have been calculated for each of the mentioned dimensions and dimension items by groups of comparison.

"Health literacy" questions allowed to assess the study participants' access to the information/knowledge about COVID-19, their ability to understand and use the information, to judge how reliable is it. The higher score indicated greater access to the COVID-19 information, higher ability to understand and use the information. The results showed that the majority of study participants in both compared groups felt they had moderate access to the COVID-19 information, and are able to understand and use it to some extent (Table 4). At the same time there was a problem with the ability to evaluate the credibility of the information in media (the average scores in cases and controls were 4.18 and 3.39, respectively, from the 7 as the highest score). The difference between as summary scores, as well as average scores calculated for each dimension item were not statistically significant in the compared groups. The mode which showed the most common response to each statement, for all the dimension items, except judgement about the credibility of COVID-19 information in media, in both compared groups was equal to 7 (the highest value). The mode for the ability to evaluate the COVID-19 information

credibility in media as in group of cases, as well as in group of controls was equal to 5, which corresponds to moderate answer option.
"COVID-19 risk perception: Probability and Severity" dimension provided self-assessment of the probability and susceptibility of contracting COVID-19 and gave the opportunity to identify possible patterns in behaviors related to risk perceptions. The summary scores in groups of cases and controls were 8.72 (3.32) and 8.06 (3.29), respectively and the difference was not statistically significant. The mode for the self-assessed probability of getting infected with COVID-19 and the awareness about COVID-19 preventive measures in both compared groups was 7, the mode for the item about the severity of contracting COVID-19 in group of cases was equal to 1, among controls – 4.
Statistically significant difference was found between the summary scores calculated for the dimension "Preparedness and perceived self-efficacy" allowing to identify possible patterns in behaviors/perceptions related to self-efficacy (the mean values in cases and controls were 9.09 (2.79) and 10.38 (2.33), respectively, t= 3.80, p=0.000). The controls showed a higher confidence about their awareness of COVID-19 preventive measures (the mean values were 5.28 (1.71) and 5.91 (1.41) in cases and controls, respectively, t= 3.016, p=0.003) and ability to avoid the infection (the mean values were 3.82 (1.86) and 4.48 (1.68), respectively, t= 2.830, p=0.005). The difference was found also between the modes for this item (4 and 5 in groups of cases and controls).

"Prevention-own behaviors" dimension allowed to compare study participants' knowledge and behavior and identify resiliency in upholding recommended behaviors which may need to be addressed. As presented in Table 4, the difference between summary scores calculated in groups of cases and controls for assessing this dimension was not statistically significant. Statistically significant difference was found between mean scores for "hand washing" (5.55 (0.17) and 6.01 (0.14) in groups of cases and controls, respectively, t=2.074, p=0.039), "avoiding touching face with unwashed hands" (4.74 (0.21), 5.48 (0.17), t=2.7752, p=0.006), "avoiding social events" (5.45 (0.66), and 3.86 (0.22), t=2.310, p= 0.022), "staying at home from work" (3.81 (0.24) and 2.79 (0.20), t=3.296, p=0.001). These preventive behaviors were the most important ones recommended by the Centers for Disease Control and Prevention of the United States to protect people from contracting COVID-19 [27]. The mode for all the items of "Prevention-own behaviors" dimension, except "avoiding social events", "staying at home from work" and "using of antibiotics", in both compared groups was 7. The mode for the "staying at home from work" item was equal 1, and for avoiding social events it was 1 among the controls and 7 among cases. Preventive behavior was mentioned statistically significant more often by females compared to males (62.7% and 42.0, chi-square= 6.131, p=0.013) and by those who had higher education compared to the participants with elementary education (60.4 and 18.2%, chi-square= 7.356, p=0.025).

"Affect" dimension allows to identify mental health implications of restriction – ultimately potentially as a warning sign that restrictions need to be changed. According to the research results the difference between summary scores calculated in the groups of cases and controls for assessing this dimension was not statistically significant. At the same time, difference by some of

the dimension items was significant: the study participants feeling that COVID-19 is always around (5.98 (0.17) and 4.90 (0.14) in cases and controls, respectively, t=4.918, p=0.000), persistent thoughts of COVID-19 (5.76 (0.18) and 5.09 (0.17), t=2.721, p=0.008), fear of COVID-19 (5.85 (0.16) and 5.04 (0.17), t=3.434, p=0.001), feeling of helplessness (5.70 (0.17) and 5.16 (0.18), t=2.190, p=0.031), stressful condition for fear of getting infected (6.07 (0.14) and 5.45 (0.19), t=2.693, p=0.008). Thus, the results of analysis demonstrate dangerous mental health of those who got infected with COVID-19 compared to the group of not infected.
The mode for all the items among cases was equal to 7. In the group of controls mode was equal to 7 only for such items as the opinion about the infection fast spreading, and opinion that the COVID-19 problem was not exaggerated by the media, for the rest items modes were equal to 4.

"Trust in sources of information" dimension allows to identify trusted information sources, to be used for planning communications. It has been shown that the difference between as summary scores, as well as scores calculated for each dimension item in the groups of cases and controls was not statistically significant. Medical personnel (the mean values were equal to 5.56 (1.92) and 5.25 (1.92) in cases and controls) and social networks ((2.88 (1.96) and 3.03 (1.85)) were considered the most trustworthy and the most untrustworthy sources of information in both compared groups, respectively. The mode values calculated for medical personnel item in both compared groups was equal to 7. Besides that, the group of cases indicated MoH (Mo=7), and the group of controls - WHO (Mo=5). All other sources of information were assessed as completely untrustworthy (Mo=1).

As presented in Table 4 study participants of both groups were not interested in active seeking of COVID-19-related information. The mode in both groups was the lowest (Mo=1).

COVID-19-related myths and conspiracy theories are one of the barriers to fighting the COVID-19 pandemic. Some of the people do not believe in COVID-19 existence, it is really hard for many of them to accept that a "flu-like illness" could be life-threatening [28]. Some believe that COVID-19 is a business for health care workers (HCWs) and doctors are diagnosing every fever as COVID-19 for their benefits. The claim that COVID-19 is a pre-planned project to cover the Bill Gates trackable microchip conspiracy was also raised [29,30] In connection with the above, the storm of "infodemic", conveyed by social media is of great concern.

The Conspiracies dimension of the used statistical tool allows to detect trends in possible conspiracy theories which may need to be addressed for reduction of the COVID-19 related myths, prevalence of the diseases and death rate.

According to the results of analysis, there was no significant difference between the summary scores calculated for "Conspiracies" dimension in the cases and controls. At the same time, the representatives of the group of controls were more inclined to believe that politicians usually do not tell citizens the true motives of their decisions (4.54 (0.19) and 5.28 (0.17) in groups of cases and controls, respectively, t=2.911, p=0.004). The calculated mode values revealed that the majority of the study participants in both compared groups believe in COVID-19 related myths. The mode values calculated for the items assessing the participants' opinion about the public's

opportunity to be informed about important things that happened in the world, about availability of politicians' true motives for COVID-19 related decisions, presence of secret organizations greatly influencing COVID-19 related political decisions, in both compared groups was equal to 7. The majority of the cases did not believe at all that the government agencies monitor all citizens (Mo=1), whereas the controls had about it neutral position (Mo=4). The majority of cases were absolutely sure that events which superficially seem to lack of a connection are often the result of secret activities (Mo=7), whereas controls were neutral on that issue (Mo=4). There was no statistically significant correlation between the participants' believe in COVID-19 conspiracy theories and the risk perception (ρ =-0,410, p>0.05), as well as adoption of preventive behavior (ρ =-0,234, p>0.05), but there was moderate correlation between the believes and the attitude to COVID-19 vaccination (-0.476, p=0.004).

The Resilience dimension allows to assess public's perceptions related to coping with COVID-19 related stress and so identify mental health implications of restriction. As shown in Table 4 the cases were more likely than the controls to indicate that it was difficult for them to cope with the stress. The mode for this dimension was equal to 4 and 1 in the groups of cases and controls, respectively.

The perception of the study participants related to the fairness of COVID-19 decisions was assessed via "Fairness" dimension. The analysis showed that there was no significant difference between the perceptions, both groups gave moderate assessment (Table 4), although the mode calculated for each of the dimension items demonstrated neutral assessment (Mo=4).

The "Restriction" dimension allows to assess people's perception related to COVID-19 restrictions. Both compared groups showed moderate attitude to the COVID-19 restrictions (Table 4). There was no significant difference between the summary scores for this dimension, as well as between the mean scores calculated for each item. Mode values for items, assessing the necessity of compulsory face masks in closed public spaces (Mo= 7), necessity of mandatory COVID-19 vaccination (Mo=1), provision by employees a certificate of vaccination (QR code) or PCR test results every 14 days (Mo=7), opening borders to more countries (Mo=7) were also equal. Thus, the most negative attitude among all restriction was toward mandatory COVID-19 vaccination. With regard to the opinion on the severity of COVID-19 restrictive measures, controls were more often tended to think that the restrictions currently being implemented are greatly exaggerated (respectively Mo=4 and Mo=7 in the groups of cases and controls), whereas the cases more often noted their insufficient severity (Mo=5 and Mo=1 in the groups of cases and controls, respectively).

Social, cultural, and political contexts play the vital role in decision making regarding vaccine acceptance and refusal. Anti-vaccine controversies concerning vaccine safety are vigorously circulating by social media via different platforms, upsurge the vaccine hesitancy among community members.

According to the results of the analysis there was no statistically significant difference between the summary scores, assessing the study participants' attitude to the COVID-19 vaccination in two compared groups. The majority of cases and controls were ready to be vaccinated or were

already vaccinated (67.3% and 76.1%, respectively). At the same time, cases more often than controls expressed regret that they were not vaccinated earlier (3.99(0.23) and 3.02(0.22), respectively, t=3.046, p= 0.003). The mode values calculated for all dimension items were equal in both compared groups. Most often, study participants strongly believed that the vaccine could help control the spread of COVID-19 (Mo=7), noted that they would advise others to be vaccinated (Mo=7), and would be vaccinated even after the infection, or if they knew that the majority of the population were vaccinated against COVID-19 (Mo=7).
As shown in Table 4, the summary scores calculated for the dimension "Vaccination factors" were significantly different in the cases and controls only due to the difference between the scores calculated for the item "Dependence of the willingness to be vaccinated on the risk of getting infected". The cases were more likely than the controls to take into account the risk of getting infected when making vaccination decisions.

Most often as factors influencing the readiness to be vaccinated, study participants in both groups indicated: risk of getting infected, vaccine side effects (Mo=7), use in other countries (Mo=7). The group of cases also often indicated the quality of the vaccine (Mo=7) and advice of family doctor (Mo=7). Nevertheless, difference was statistically significant only between the average scores calculated for risk of getting infected and quality of the vaccine.

The anti-vaccine behaviors among community due to misinformation might potentially hamper the COVID-19 vaccine program and to have domino effects on other vaccination program. That is why it was also interesting to explore the attitude of study participants to the vaccination according to the national vaccination schedule. It was revealed that controls significantly more often than the cases agreed with the opinion that all vaccines are important, except COVID-19 vaccine (respectively, 38.8% of cases and 47.1% of controls, chi-square=4.50, p>0.05).

Table 4.

Dimensions	**Possible range of raw score (Min-Max)**	**Cases**	**Controls**	**t, p-value**
		Mean score (SD)	**Mean score (SD)**	
Health literacy	7-49	33.37 (12.27)	35.28 (12.54)	t= 1.10, p>0.05
COVID-19 risk perception: Probability and severity	2-14	8.72 (3.32)	8.06 (3.29)	t= 1.47, p>0.05
Preparedness and perceived self-efficacy	2-14	9.09 (2.79)	10.38 (2.33)	t= 3.80, p=0.000
Prevention-own behavior	9-63	45.34 (10.44)	45.11 (11.62)	t= 0.14, p>0.05

Affect	7-49	41.06 (1.93)	37.36 (2.09)	t= 1.273, p>0.5
Trust and use of sources of information	9-63	33.02 (12.54)	32.31 (11.71)	t= 0.40, p>0.05
Frequency of information	1-7	3.76 (2.11)	3.39 (2.10)	t= 1.32, p>0.05
Conspiracies (perception)	5-35	25.55 (3.72)	24.11 (3.38)	t= 1.272, p>0.05
Resilience	1-7	4.22 (0.19)	3.20 (0.19)	t=3.784, p=0.000
Fairness	2-14	8.40 (3.41)	7.86 (3.52)	t= 1.15, p>0.05
Restrictions **Summary score** Opinion that COVID-19 restrictions are excessive Opinion that restrictions should be more excessive Opinion that the government should have the opportunity to vaccinate all people forcibly Opinion that the government should conduct mass free of charge vaccination	10-70	50.75(7.38) 4.12 (1.95) 4.18 (1.96) 3.53 (2.33) 5.97 (1.77)	53.15 (5.06) 4.49 (2.25) 3.91 (2.21) 3.27 (2.33) 5.40 (2.18)	t= 0.88, p>0.05 t= 1.32, p>0.05 t= 0.96, p>0.05 t= 0.82, p>0.05 t= 2.14, p=0.03
Were worry about economic consequences of COVID-19		5.15 (1.98)	5.01 (2.11)	t= 0.50, p>0.05
Agreement with COVID-19 restrictions		13.55 (5.04)	13.38 (8.88)	t= 0.26, p>0.05
Vaccines **Summary score**	6-42	31.92 (7.22) 13.79 (5.62)	32.67(6.51) 12.64 (5.54)	t= 0.57, p>0.05

Positive attitude to the COVID-19 vaccination Negative attitude to the COVID-19 vaccination		9.59 (5.37)	8.98 (5.64)	t= 1.51, p>0.05 t= 0.80, p>0.05
Vaccination factors Summary score The dependence of willingness to be vaccinated on vaccine quality	9-63	40.39(16.34) 15.00 (8.92)	36.05(15.06) 13.31 (5.55)	t= 2.00, p=0.047 t= 1.70, p>0.05
The dependence of willingness to be vaccinated on advices		12.17 (5.58)	10.88 (5.81)	t= 1.68, p>0.05
Dependence of the willingness to be vaccinated on the risk of getting infected		5.21 (2.07)	4.49 (2.38)	t= 2.44, p=0.015
Dependence of the willingness to be vaccinated on vaccine's accessibility		8.00 (4.36)	7.20 (4.38)	t= 1.35, p>0.05

The "Unwanted behavior" dimension allowed to study the changes in study participants' behavior due to COVID-19 pandemic. According to the results of the analysis, the difference between the frequency of occurrence of unwanted behavior was not statistically significant among cases and controls (17.3% and 13.0% among cases and controls, respectively, chi-square= 0.784, p>0.05).

All significant variables were further analyzed using a logistic regression model to conclude which factors could be the predictors of getting infected with COVID-19 (Table 5). Of these, younger age (OR= 1.046; 95% CI= 1.026-1.066) and preparedness and perceived self-efficacy (OR= 0.815; 95% CI= 0.713-0.930) were found to be associated with reduced risk of getting infected with COVID-19.

Table 5. Results of logistic regression analysis to estimate the odds (odd ratio, OR) of getting infected.

Variables in the model	Cases	Controls	OR	95%CI	p-value
Age	52.1	39.0	1.046	1.026-1.066	0.000
Preparedness and Perceived self-efficacy	9.09	10.38	0.815	0.713-0.930	0.002

Study limitations

Self-reported behaviors are known to differ from actual behavior, not least due to the social desirability effect, and so the findings related to behavior should be interpreted with this reliability limitation in mind.

As each country adapts the questionnaire, not all data collected with this tool can be compared across countries for future evaluation purposes. The hope is that each country will collect and analyze at least several variables in common that may provide useful insights for cross-country comparison, but the main purpose of this tool is to help countries right now to determine the best approaches for their immediate COVID-19 response.

Conclusion

The COVID-19 pandemic has not finished yet, and so information about factors that influence individual protective behavior is crucial for the development and correction of strategies that help adjust public behavior to control the pandemic. The current study helped to identify the peculiarities of RA population response to public health measures aimed at controlling the COVID-19 pandemic.

The results showed that the majority of study participants in both compared groups felt they had moderate access to the COVID-19 information, and are able to understand and use it to some extent. At the same time there was a problem with the ability to evaluate the credibility of the information in media. Maybe that's why participants of both groups were not interested in active seeking of COVID-19-related information. Medical personnel and social networks were considered the most trustworthy and the most untrustworthy sources of information in both compared groups, respectively. There was no significant difference between summary scores and item scores calculated for the "Trust in sources of information" dimension in the compared groups.

The comparison of the COVID-19-related knowledge and cognitive risk perceptions revealed that the controls were significantly more confident about their awareness of COVID-19 preventive measures and ability to avoid the infection compared to cases. Despite a higher perception of the COVID-19-related risk among cases, there was no significant difference between the acceptance of restrictive measures in two compared groups. Although, study participants in the group of cases were statistically significant more likely to express an opinion about the necessity of compulsory vaccination.

Higher awareness of controls about effective preventive measures contributed to the more frequent implementation of some of them by controls compared to cases. The difference between the summary scores calculated for the "Prevention-own behaviors" dimension in two compared groups was not statistically significant, nevertheless, significant difference was found between mean scores for "hand washing" and "avoiding touching face with unwashed hands". Preventive behavior was mentioned statistically significant more often by females compared to males and by those who had higher education compared to the participants with elementary education.

The results of analysis demonstrated dangerous mental health of those who got infected with COVID-19 compared to the group of not infected. The level of COVID-19 related stress was significantly higher among cases, and the cases were more likely than the controls to indicate that it was difficult for them to cope with the stress.
COVID-19-related myths and conspiracy theories are one of the barriers to fighting the COVID-19 pandemic. According to the results of the study, there was no significant difference between the summary scores calculated for "Conspiracies" in the groups of cases and controls. At the same time, the representatives of the group of controls were more inclined to believe that politicians usually do not tell citizens the true motives of their COVID-19-related decisions. There was no statistically significant correlation between the belief in COVID-19 conspiracy theories and the risk perception, as well as adoption of preventive behavior, but there was moderate correlation between the beliefs and the attitude to COVID-19 vaccination.

Both compared groups showed moderately positive attitude to the COVID-19-related restrictions. There was no significant difference between the summary scores for this dimension, as well as mean scores calculated for the dimension items. The most negative attitude among all restriction was toward mandatory COVID-19 vaccination in both compared groups.

According to the results of the study there was no statistically significant difference between the summary scores assessing the study participants' attitude to the COVID-19 vaccination in two compared groups. The majority of cases and controls were ready to be vaccinated or were already vaccinated (67.3% and 76.1%, respectively). At the same time, cases more often than controls expressed regret that they were not vaccinated earlier. The summary scores calculated for the dimension "Vaccination factors" were significantly different in the cases and controls only due to the difference between the scores calculated for the item "Dependence of the willingness to be vaccinated on the risk of getting infected". The cases were more likely than the controls to take into account the risk of getting infected when making vaccination decisions.
Controls significantly more often than the cases agreed with the opinion that all vaccines are important, except COVID-19 vaccine.

The assessment of the "Unwanted behavior" dimension revealed that the prevalence of COVID-19-related unwanted behavior was not high and significant among cases and controls (17.3% and 13.0% among cases and controls, respectively).

All significant variables were further analyzed using a logistic regression model to conclude which factors could be the predictors of getting infected with COVID-19. Of these, only younger age (OR= 1.046; 95% CI= 1.026-1.066) and preparedness and perceived self-efficacy (OR= 0.815; 95% CI= 0.713-0.930) were found to be associated with reduced risk of getting infected with COVID-19.

The results of the study which indicated an overall perception of low risk associated with higher stress levels, could be the foundation for more effective campaigns and efforts by healthcare authorities in RA. Since it was revealed that higher levels of knowledge and attitudes were significantly associated with higher educational levels, it is essential to launch targeted educational campaign covering people with low educational level.

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