

SURVEY ON COVID-19 VACCINATION OF THE POPULATION IN THE OLTENIA REGION

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Abstract: *Vaccination of the population for immunization against the new coronavirus SARS-CoV-2 is of great importance for the COVID-19 pandemic. Romania has one of the lowest vaccination rates in the European Union, so during the fourth wave of coronavirus, impressive figures were reached with respect to the number of people infected and dying daily. The refusal or hesitancy of people to get vaccinated leads to an increasing number of patients admitted to intensive care units and even dead, increasing the pressure on the medical system. This survey is developed based on a questionnaire applied to people in the Oltenia region. In order for a person to be part of the target group, that person had to meet, cumulatively, the following conditions: 1) the minimum age of 16 years; 2) residence in one of the counties of the Oltenia region. Out of the total number of respondents who answered the questionnaire, 24.66% had the disease and 67.95% were vaccinated against COVID-19. A percentage of 87.4% of the respondents is represented by graduates of higher education, such category of population being more interested in managing the harmful effects of the new coronavirus SARS-CoV-2 on human society. The vaccination rate in the Oltenia region, highlighted by the present survey, is 59.30% in rural areas and 71.46% in urban areas; such percentages mostly characterize the category of people with a higher education. Vaccination is mostly accepted by higher education respondents who are aware that this is one of the most effective measures to combat the COVID-19 pandemic. The reasons for the refusal of vaccination are mainly due to the lack of information on the possible adverse effects of vaccination. The degree of acceptance of COVID-19 vaccines by respondents is low compared to the degree of acceptance of vaccines included in the national vaccination scheme and optional vaccines other than COVID-19. It is necessary to carry out a pro-vaccination campaign, conducted by communicators with probity in professional practice, to increase the confidence of the population in COVID-19 vaccines approved worldwide and the degree of acceptability of vaccination as an effective measure to combat the spread of the pandemic.*

Keywords: COVID-19; pandemic; vaccination; Romania; Oltenia; hesitancy; refusal.

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1. Introduction

The last two years have posed great challenges for worldwide medicine, due to the emergence and global expansion of the new coronavirus SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), the name given by the World Health Organization (WHO) to the new coronavirus strain. The disease caused by the SARS-CoV-2 coronavirus is known as COVID-19, being declared by the WHO as a pandemic in March 2020. Romania is one of the most affected countries in the world, if we refer to the number of people who died due to the infection with the new coronavirus.

From the date of the first case (28.02.2020) and until the end of the analyzed period (01.11.2021), the graphical variation of the statistical parameters (covid19.geospatial.org, 2021), in absolute figures and percentage assessments (only for the case of deceased persons), is shown in Fig. 1-4.

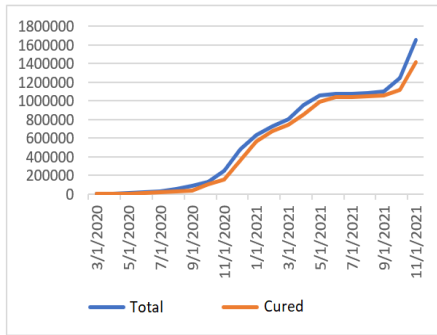


Fig. 1 Pandemic evolution (total/cured)

Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

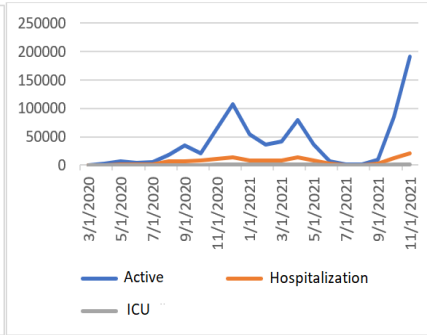


Fig. 2 Pandemic evolution (active/hospitalizations/ICU)

Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

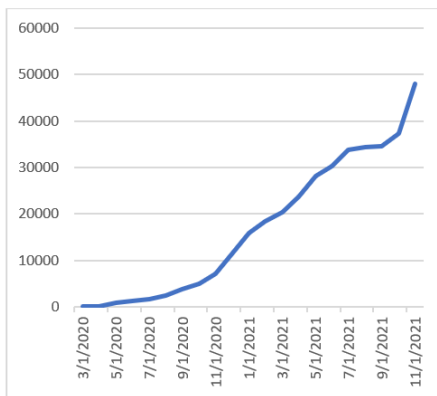


Fig. 3 Death evolution (absolute)

Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

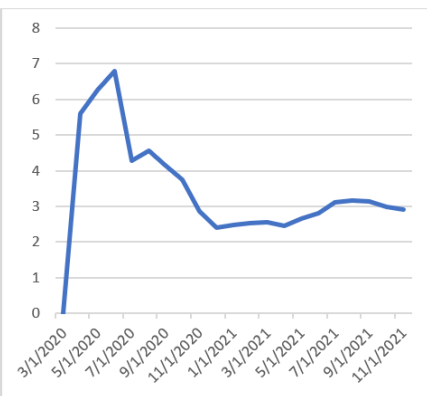


Fig. 4 Death evolution (percentage)

Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

So far, Romania has gone through four waves of pandemic, (Peptan and Peptan, 2021) one harder than another, which led to a large number of infected and deceased people. The first wave occurred between the onset of the pandemic and somewhere in late May 2020. The second wave was between mid-October and the end of December 2020. The third wave occurred in the second half of March 2021 and the first part of May. The fourth wave began in September 2021 and is ongoing. By the end of the analyzed period, 01.11.2021, 1,655,021 cases of infected people and 48,073 deaths were nationally reported (see worldometers.info).

The Romanian medical system faced a lot of challenges, especially in the fourth wave of the pandemic, being close to collapse due to outdated infrastructure, lack of medical equipment and medical staff serving the COVID-19 departments (euronews.com, 2021; libertatea.ro, 2021). To this endogenous causality of the Romanian medical system was added an exogenous causality, which led to the increase of cases of infection with the new coronavirus SARS-CoV-2 at national level, respectively to the low acceptance rate of vaccination with nationally authorized COVID-19 vaccines

(Peptan and Peptan, 2021). At the time of this survey, the percentage of eligible population who have been vaccinated with at least one dose is approximately 44%, and the percentage of those fully vaccinated is 36.5%, while experts are saying that "the vaccination rate of the population should be somewhere above 80 percent to mitigate the impact of the pandemic" (digi24.ro, 2021; observatornews.ro, 2021). The dynamics of the fully vaccinated people, at national level, is shown in Fig. 5.

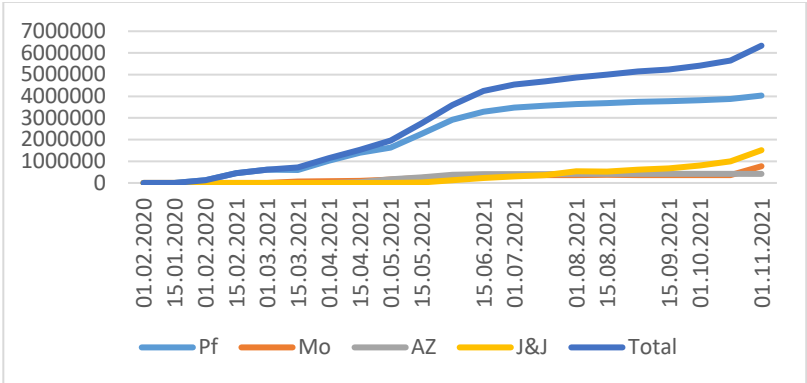


Fig. 5 Evolution of vaccination – Fully vaccinated
 Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

One of the causes that has led to the reserve of the population to accept the vaccination is the occurrence of side effects among people who have been vaccinated against COVID-19. The dynamics of the side effects recorded at national level is shown in Fig. 6-7. It is noticed that the total number of side effects reported per thousand doses administered is, at the end of the analyzed period, around 1.5 / 1000, a value within the parameters accepted by the international medical community.

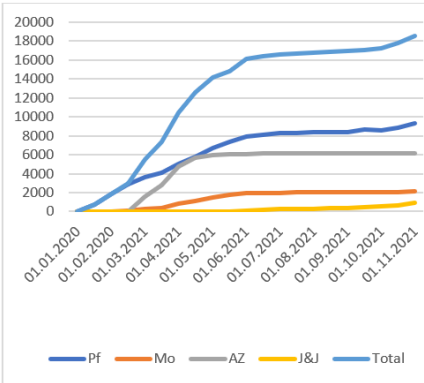


Fig. 6 Dynamics of vaccination side effects
 Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

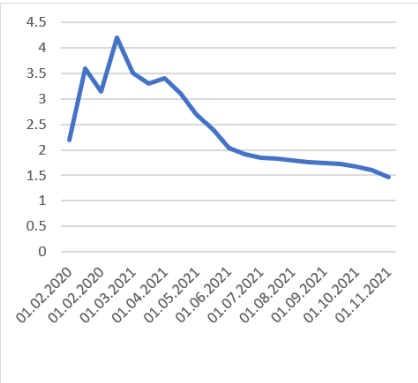


Fig. 7 Percentage change in side effects
 Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

At the end of the analyzed period, the situation of the total number of SARS-CoV-2 (graphs.ro) coronavirus infections and of the vaccination percentage (hotnews.ro) at the level of the counties of the Oltenia region is shown in Fig. 8-9.

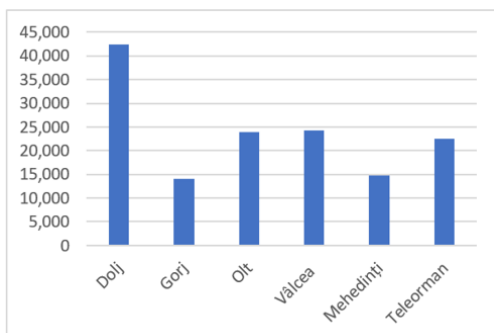


Fig. 8 Vaccination status in Oltenia
Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

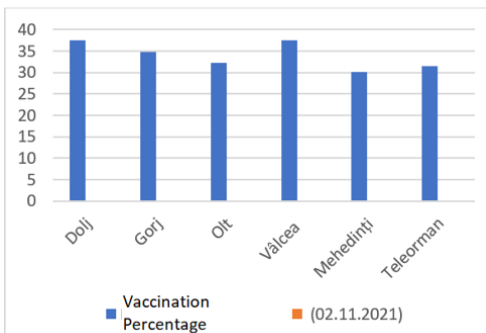


Fig. 9 Vaccination percentage in Oltenia
Data source: vaccinare-covid.gov.ro, graphs.ro, datelazi.ro

This survey is intended to offer both qualitative and quantitative research concerning the decisions of the population in the Oltenia region to hesitate, reject or accept the inoculation of a COVID-19 vaccine.

2. Research methods

2.1. Participants

Our survey was conducted during the fourth wave of the COVID-19 pandemic in Romania. The questions addressed to the population in the Oltenia region were intended to notice the reasons for accepting or rejecting the vaccination against COVID-19. In order for a person to be part of the target group, he must meet two conditions: 1) to be at least 16 years old; 2) to live in one of the counties in the Oltenia region. Participants were informed about the aim of the survey, its authors and the financing source. The questionnaires were anonymous, as there were no identifying elements of the respondents.

2.2. Procedure

An anonymous questionnaire created through the Google Forms platform was applied and it was allowed to distribute it through a weblink. The questionnaire was posted on the most used social platforms, aiming to cover the entire geographical area of Oltenia.

2.3. Measurements

The aim was to extract the following data: socio-demographic; availability of respondents regarding vaccination against COVID-19; the degree of acceptance of respondents regarding mandatory / optional vaccines, other than those against COVID-19; their confidence in vaccines and the Romanian medical system; respondents' opinion on compulsory vaccination against COVID-19.

2.4. Statistical analysis of data

The analysis and processing of the extracted data, following the application of the questionnaire, were done in the Excel program, a part of the Microsoft Office Professional Plus 2019 package. It was installed on a computer with Microsoft Windows 11 Professional operating system.

The following variables were the basis for extracting the final data: 1) age range; 2) environment of residence (rural or urban); acceptance of vaccines included in the national vaccination scheme; acceptance of optional vaccines other than COVID-19 vaccines. Depending on the variables mentioned above, we extracted data on the degree of acceptance of the COVID-19 vaccines currently available in Romania. The questionnaire also included an open-ended question as to why participants chose to be vaccinated / not to be vaccinated against COVID-19. The answers were processed manually, extracting the information that allowed us to highlight the pros and cons of the vaccine.

3. Results

The present survey includes the analysis of a number of **596** valid answers. The socio-demographic data of the participants are shown in Table 1.

Age / sex / county	Ph D	Faculty	Master	Gymnasium	High School	Total
16-20 years		25			11	36
Female		20			9	29
Male		4			2	6
Do not answer		1				1
21-25 years	1	139	49	1	23	213
Female	1	99	33		21	154
Male		40	16	1	2	59
26-30 years		33	36		6	75
Female		17	25		3	45
Male		16	11		3	30
31-35 years	2	30	27		4	63
Female		21	19		1	41
Male	2	9	8		3	22
36-40 years	5	34	23	1	10	73
Female	2	19	13		6	40
Male	3	15	10	1	4	33
41-45 years	4	33	14		8	59
Female	3	17	6		3	29
Male	1	16	8		5	30
46-50 years	13	15	9		5	42
Female	7	8	4		3	22
Male	6	7	5		2	20
51-55 years	6	5	6	1	3	21
Female	4	4	5		2	15
Male	2	1	1	1	1	6

56-60 years	1	4	3	1	1	10
Female		1	2	1		4
Male	1	3	1		1	6
61-65 years	2					2
Male	2					2
66+ years	1	1				2
Female	1	1				2
Total	35	319	167	4	71	596

* some of the survey participants specified the level of ongoing studies.

3.1. The trust given to doctors

Approximately 85% of respondents have trust in doctors in Romania (Fig. 10). The high degree of confidence can be explained, in part, by the high percentage of respondents with a higher education out of the total number of respondents (87.4%).

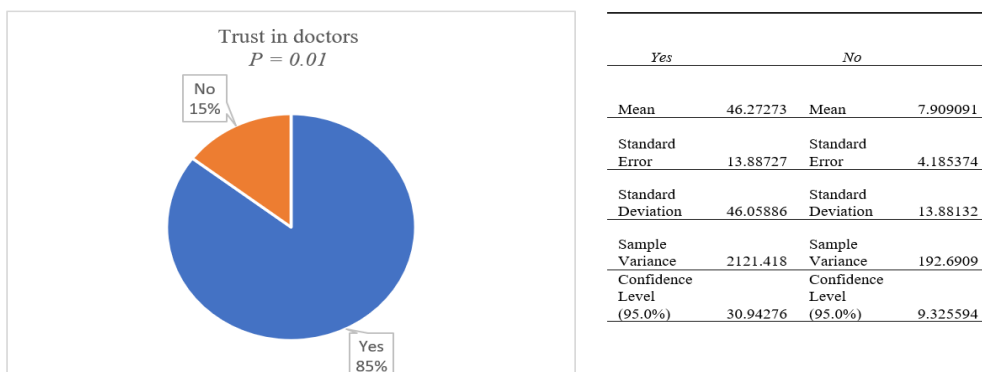


Fig. 10. The level of trust given to doctors

3.2. The trust given to the Romanian medical system

Compared to the trust shown to doctors, the Romanian medical system enjoys the trust of only 44% of respondents (Fig. 11).

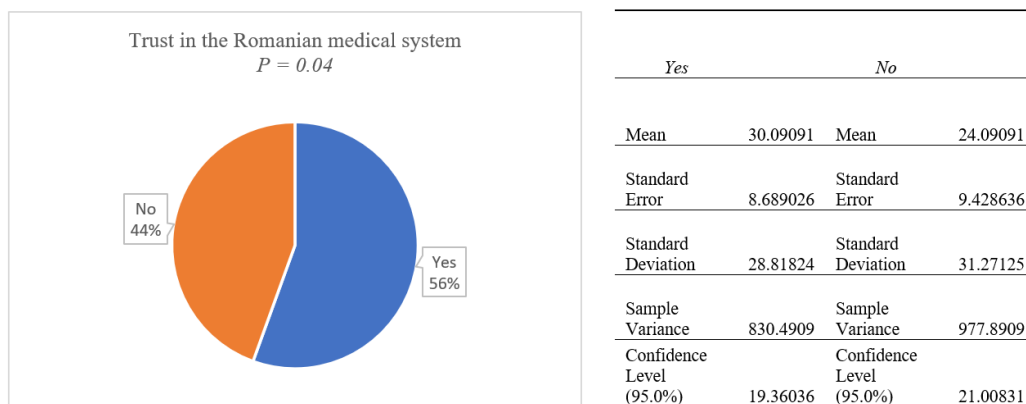


Fig.11. The level of trust given to the Romanian medical system

3.3. Analysis of vaccination of the population

The comparative analysis of the ratio between the vaccinated people with the mandatory vaccines included in the national scheme of Romania and with optional vaccines, other than the COVID-19 ones, is shown in Fig. 12.

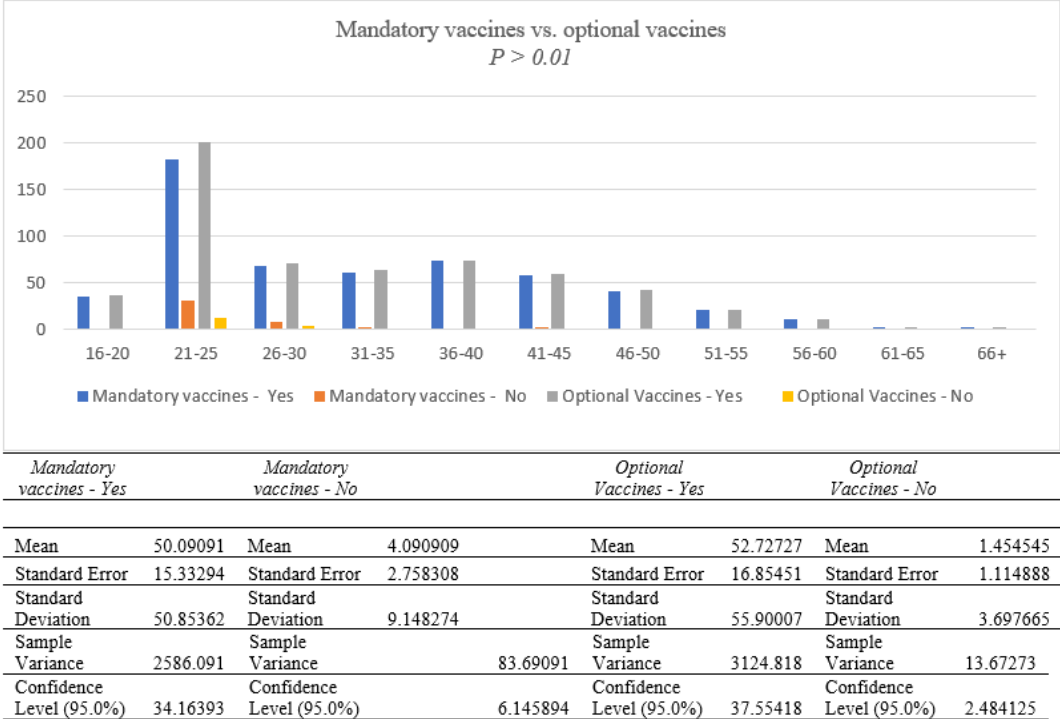


Fig. 12. Graphical representation of vaccinated people with vaccines included in the national vaccination scheme and with optional vaccines other than the COVID-19 ones.

The respondents' degree of confidence in vaccines other than the COVID-19 ones is shown in Fig. 13.

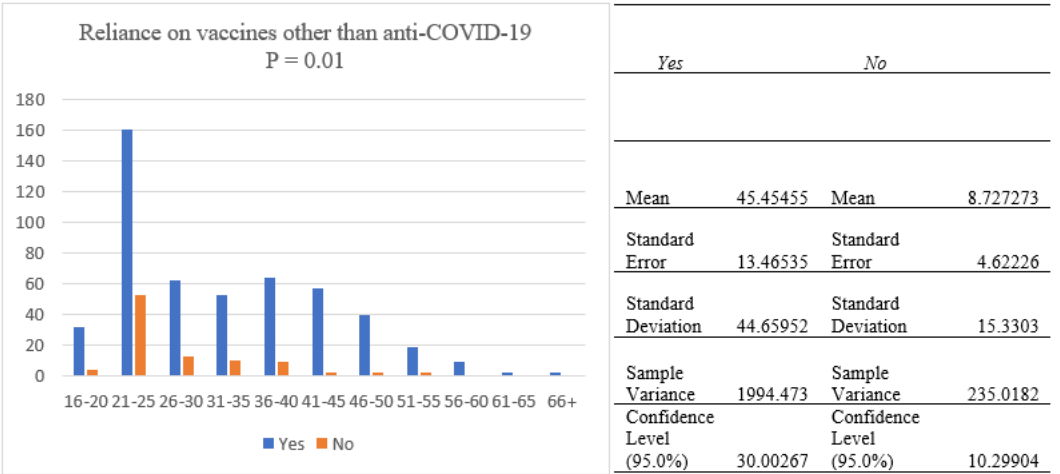


Fig. 13. Confidence of respondents in vaccines other than COVID-19

Regarding the infections with COVID-19, out of the total number of respondents, 24.66% state that they have been infected with COVID-19, the most affected age ranges being 21-25 and 36-40 years old (Fig. 14).

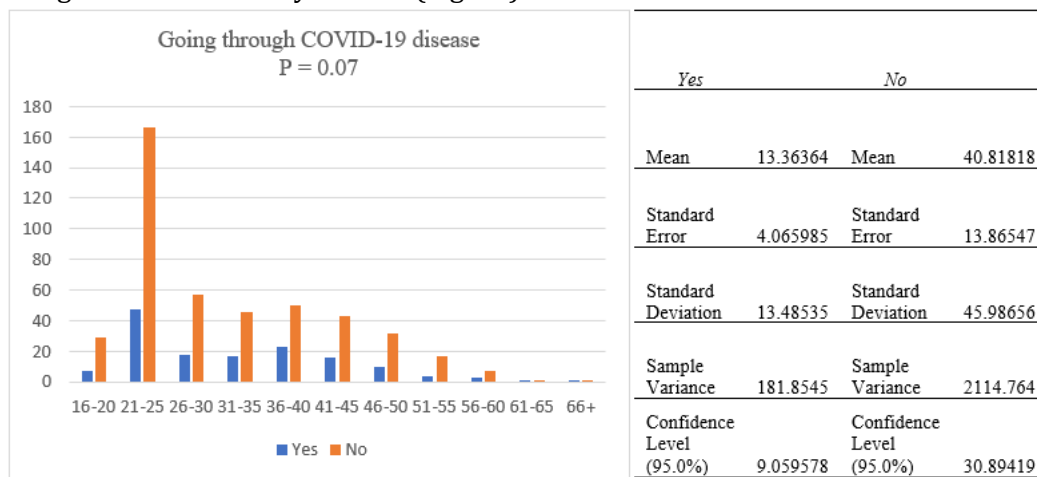


Fig. 14. Graphic representation of people who have been infected with COVID-19

Concerning the vaccination against COVID-19, 67.95% of the total respondents were vaccinated with one of the vaccines available in Romania. Respondents in rural areas are vaccinated in a proportion of 59.30%, and in urban areas 71.46% (Fig. 15). The high degree of vaccination of respondents is closely correlated with the level of their education (87.4% of respondents have higher education).

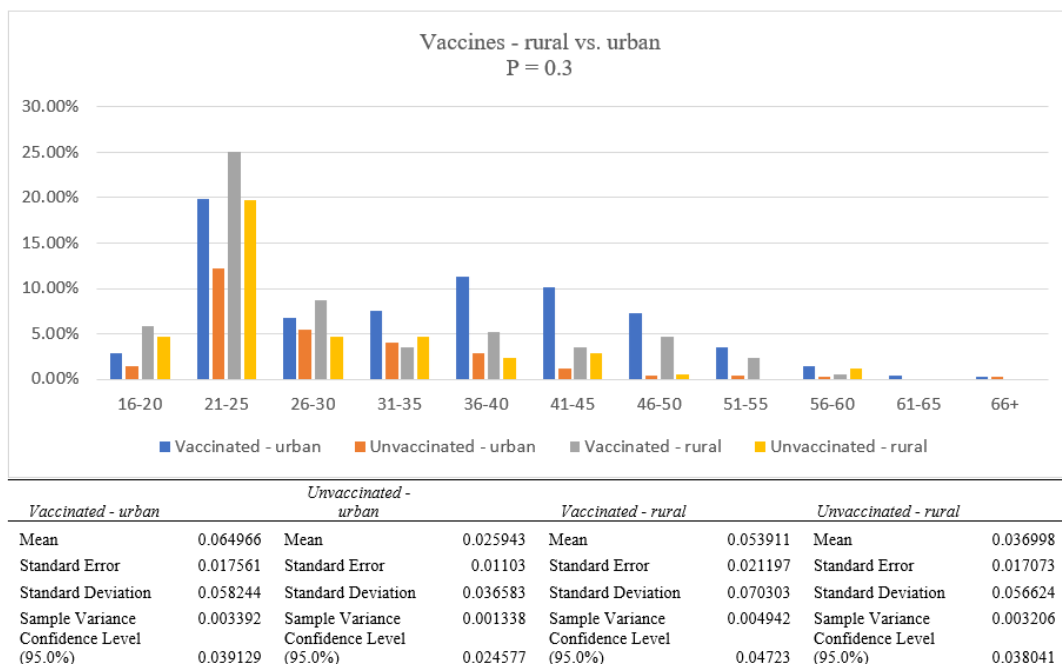


Fig. 15. Graphic representation of respondents' vaccination against COVID-19 - rural vs. urban

Referring to the degree of confidence of respondents in COVID-19 vaccines, in all age groups, the Pfizer vaccine has a high confidence (Fig. 16).

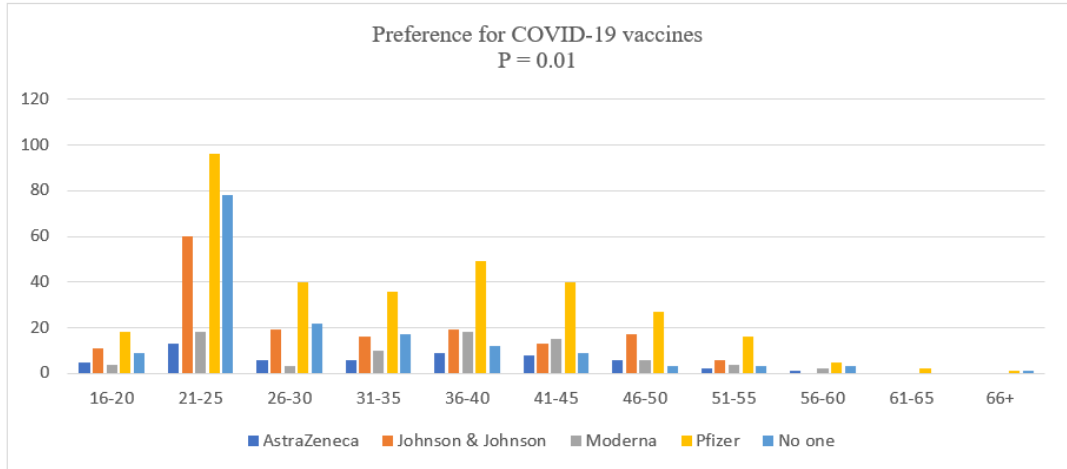
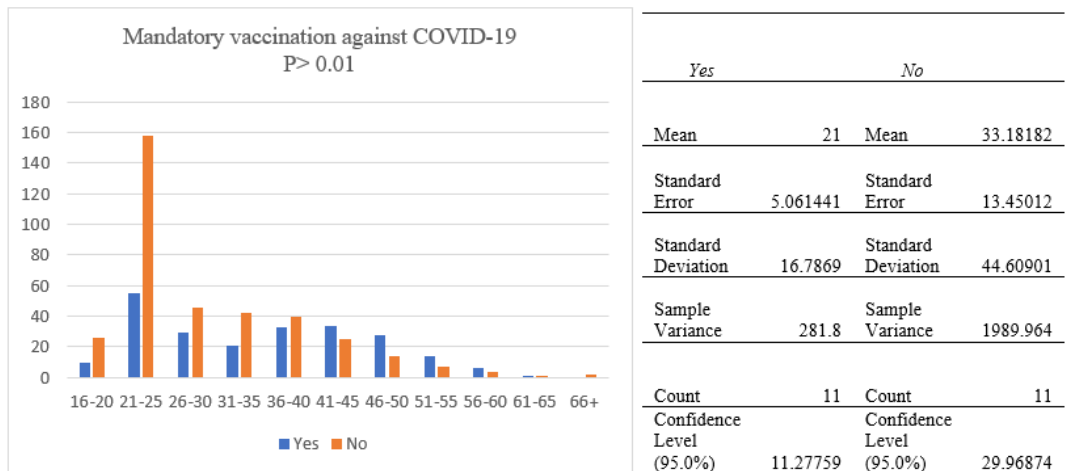


Fig. 16. Respondents' preferences regarding COVID-19 vaccines

When asked "Do you think that COVID-19 vaccination should be mandatory?", 38.76% of respondents believe that this measure would be beneficial (Fig. 17).



	Yes	No
Mean	21	33.18182
Standard Error	5.061441	13.45012
Standard Deviation	16.7869	44.60901
Sample Variance	281.8	1989.964
Count	11	11
Confidence Level (95.0%)	11.27759	29.96874

Fig. 17. Graphic representation of respondents' views on the mandatory vaccination against COVID-19

4. Discussions

The existing studies (Yoda, Katsuyama, 2021; Gyeltshen, Dema, Ahmadi et al, 2021; Aggarwal, Madaan, Sharma, 2021), which debate the issue of hesitation, rejection or acceptance of vaccination, reveal an increase in acceptance, with the exception of a few states, such as Romania. The low degree of vaccination in our country raises serious

questions about the reasons behind the opposition of people. Among the surveyed participants, the percentage of those who have been infected amounts to 24.66%, and of those vaccinated against COVID-19 amounts to 67.95%. By age categories, the degree of acceptance of vaccination is shown in Table 2.

Age range	Vaccinated	Unvaccinated	Total
16-20 years	3.69%	2.35%	6.04%
21-25 years	21.31%	14.43%	35.74%
26-30 years	7.38%	5.20%	12.58%
31-35 years	6.38%	4.19%	10.57%
36-40 years	9.56%	2.68%	12.25%
41-45 years	8.22%	1.68%	9.90%
46-50 years	6.54%	0.50%	7.05%
51-55 years	3.19%	0.34%	3.52%
56-60 years	1.17%	0.50%	1.68%
61-65 years	0.34%	0.00%	0.34%
66+ years	0.17%	0.17%	0.34%
Total	67.95%	32.05%	100.00%

According to the respondents' answers regarding the vaccination against COVID-19, those in rural areas are vaccinated in a percentage of 59.30%, and in urban areas in a percentage of 71.46% (Fig. 15). It is noted that these percentages are significantly higher than the official data on the national vaccination rate (36.5%) or the vaccination rate in the counties in the Oltenia region (Fig. 9). The explanation is due to some limitations of the research, of which the highest degree of influence has the very high percentage of respondents with a higher education.

The vaccine preferred by respondents is Pfizer (330 people). 80 people voted for the Moderna vaccine. The rest of the people opted for the AstraZeneca and Johnson & Johnson vaccines. Johnson & Johnson has also seen an increase in demand with the introduction of the green certificate, thanks to the single dose and the acquirement of the green certificate in a shorter period of time compared to the two-dose vaccines.

Regarding the degree of acceptance of the COVID-19 vaccine (Fig. 15), the extracted data reveal an increased reserve compared to the degree of acceptance of the mandatory vaccines included in the Romanian national vaccination scheme (Fig. 12).

The answers to the open-ended question regarding the participants' reasons for getting vaccinated / not getting vaccinated against COVID-19 reveal that those who chose to get vaccinated offer the following arguments: the desire to be healthy, the protection of family and loved ones; trust in the medical act; the desire to obtain the green certificate and not to be restricted; the desire to overcome this oppressive period. The reasons of those who have not been vaccinated are as follows: lack of information on COVID-19 vaccines, vaccination is an experiment for which pharmaceutical companies and / or medical staff do not assume possible side effects, lack of information on side effects that may occur over time.

5. Research limitations

Although our survey features many strengths, there are some limitations that influence the results.

The percentage of respondents is not uniform in the Oltenia region, about 60% of respondents being from Dolj, Gorj and Mehedinți counties.

Another limitation, which has the greatest degree of impact on the results of our survey, is determined by the level of education of the respondents, 87.4% of them having higher education, the remaining 12.6% having only pre-university studies.

The lack of a question about the existence of participants' comorbidities. Such a question would have helped us to determine the degree of acceptance of the vaccination much better.

6. Conclusions

The data we obtained from the application of the questionnaire in the geographical area of Oltenia reveal, first of all, the willingness to answer the questions, in a significant percentage, of the respondents with a higher education (87.4%) and less of those with a lower level of education. We find such data in most studies that deal with this topic (Ladhani, 2021; Carnalla, Basto-Abreu, Stern et al, 2021; Holzmann-Littig, Braunisch, Kranke et al, 2021; Fakonti, Kyprianidou, Toumbis, 2021; de Bruin, Ulqinaku & Goldman, 2021; Lin, Chou, Chang et al 2021). A first conclusion can be drawn, i.e. the level of involvement of people in the Oltenia region in managing issues of interest to society is directly proportional to the level of education.

Closely correlated with the previous issue, the survey shows that the vaccination rate in the Oltenia region is 59.30% in rural areas and 71.46% in urban areas, largely characterizing the category of people with a higher education.

There is a significant percentage of respondents (32.05%) who refuse vaccination, the reasons underlying this decision being closely correlated with the degree of their information on the effects of vaccination.

The degree of acceptance of COVID-19 vaccines remains low compared to the degree of acceptance of vaccines included in the national vaccination scheme and optional vaccines other than COVID-19 which is 92.45%.

It is noted that there is a high percentage of participants who believe that vaccination against COVID-19 should be mandatory (38.76%) highlighting the high level of awareness of the negative effects of the pandemic.

Finally, we believe that a COVID-19 vaccination campaign, based on scientific data presented by medical specialists, will help increase the vaccination rate, as it is known that vaccination is the most effective way to prevent infection with the new coronavirus SARS -CoV-2.

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