4.3 Analysis of gaps in educational activity of physicians and pharmacists on the vaccination of population

Investigation of the population's vaccination in different countries of the world is conducted by scientists regularly and consistently. It concerns the vaccination calendar and individual vaccinations for a particular disease [233]. In addition, Internet sites with information on the vaccination status for certain diseases in countries worldwide are available for free access [234]. From the beginning of the Covid-19 global pandemic in 2019 and the development of different types of vaccines against this disease, the problem of people's readiness to get vaccinated has become particularly wide and resonant [235-238].

To understand the situation regarding the problem of population readiness for vaccination, we developed a questionnaire form, which consisted of 16 questions. We suggested answers for each question with a variant of the respondent's response to some questions. The questions of the questionnaire are presented in table 1.

The purpose of the survey, according to this questionnaire, was to analyze the degree of awareness of parents and future parents about the feasibility of vaccination in childhood and to determine the main reason for refusing vaccination.

The survey was conducted according to a single specially developed protocol using network technologies. The questionnaire included a total of 16 questions, which were divided into several blocks: 1) demographic indicators of respondents; 2) actual data on respondents' vaccinations; 3) attitude of respondents to the vaccination process; 4) assessment of respondents' awareness, compliance, and adherence of vaccination problems. An anonymous survey was conducted in the Lviv region (Ukraine) from July-September 2021. Questionnaires forms were offered to respondents involved in two higher education institutions (HEI) of different subordination (Ministry of Science and Education of Ukraine – HEI-1 and the Ministry of Health of Ukraine – HEI-2). Questionnaires were filled out by survey participants (students, teachers, researchers, other staff) anonymously, on a freewill basis.

Table 1.

Questionnaire on children's vaccination

№	Questions
1.	Specify your age
2.	Education level, academic title
3.	In what locality do you live?
4.	Are you already a parent or just planning to?
5.	Have you been vaccinated against 10 diseases, carried out in childhood in the clinic free of charge?
6.	If “not”, why?
7.	If “yes”, were there any adverse reactions?
8.	If “yes”, did they lead to serious consequences?
9.	Do you consider it appropriate to vaccinate your children?
10.	Indicate the main reason for refusing to vaccinate a child.
11.	Do you prefer paid or free-of-charge vaccinations?
12.	Are you sufficiently informed about the benefits of vaccination?
13.	How do you get information about vaccinations?
14.	Are you ready to permit vaccination if you will receive detailed and reliable information about the vaccine?
15.	Do you understand and estimate the risks of an outbreak of an infection in the absence of vaccination?
16.	Are you ready to communicate with a healthcare specialist to increase vaccination awareness?

The survey covered 246 respondents, including 173 representatives of HEI-1 and 73 representatives of HEI-2. The results of the analysis of the demographic part of the questionnaire on age, level of education, and gender confirm the representative sample of respondents. The distribution of respondents by age and level of education is presented in Table 2.

Table 2.

The distribution of respondents by age and level of education

Indicator	HEI – 1		HEI-2	
	Amount, abs.	%	Amount, abs.	%
The distribution by the age				
18-21 years	39	22,5	19	26,0
22-35 years	39	22,5	18	24,7
36-50 years	61	35,3	17	23,3
50 years and older	34	19,7	19	26,0
Totally	173	100	73	100
The distribution by the level of education				
student	50	28,9	21	28,8
PhD student	6	3,5	5	6,8
Assistant professor	16	9,2	17	23,3
Associated professor	59	34,1	21	28,8
Professor	29	16,8	4	5,5
Teaching and research support staff	13	7,5	5	6,8
Totally	173	100	73	100

The applied principle of freewill participation in the survey and targeted sampling allowed us to interview respondents interested in the vaccination problem of children force of particular circumstances.

In addition, the first part of the questionnaire allowed us to distribute the respondents to several groups according to their place of residence. The results are presented in Fig. 1.

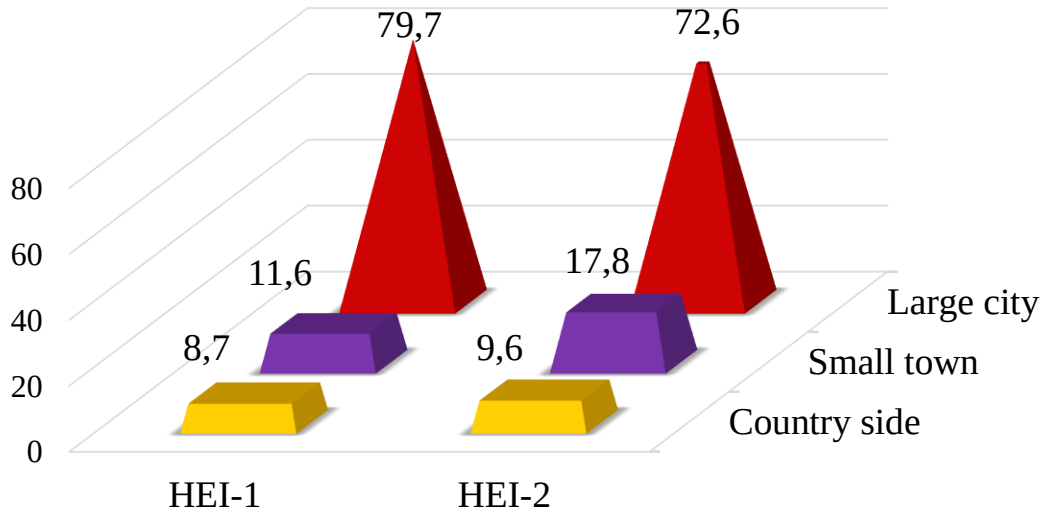


Figure 1. The distribution of respondents by size of residence (%).

The obtained data processing results, presented in Fig. 1, allow us to state that the distribution by the respondents' place of residence in both Higher Education institutions is relatively homogeneous. Fig. 2 and Fig. 3 present results concerning the parental status of respondents and the planned vaccination in childhood against 10 diseases, carried out in the clinic free of charge.

The distribution of respondents on parental status in both High Education Institutions is also relatively homogeneous. However, significant differences are observed in the distribution of respondents of both High Education Institutions on the planned vaccination in childhood against 10 diseases, which is free carried out in the clinic. The share of vaccinated persons in childhood among the respondents of HEI-1 is 93,0%, and in HEI-2 – only 64,4% (Fig. 3). At the same time, the ratio of unvaccinated persons in childhood – respondents of HEI-2 (subordination of Ministry of Health) exceeds the number of unvaccinated persons in HEI-1 (subordination of Ministry of Science and Education) 5 times.

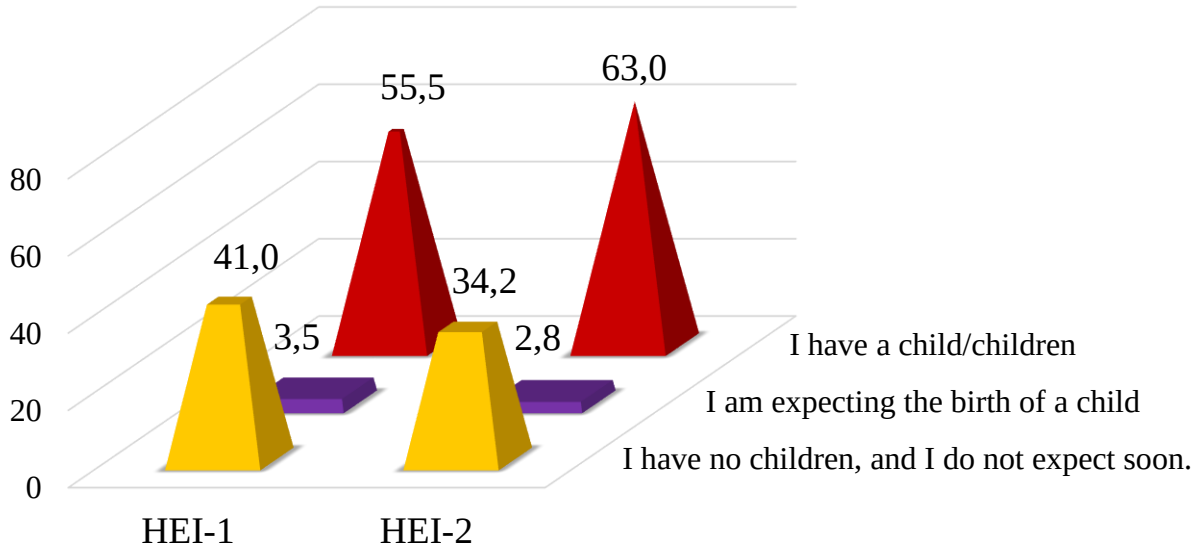


Figure 2. The distribution of respondents by the parental status (%).

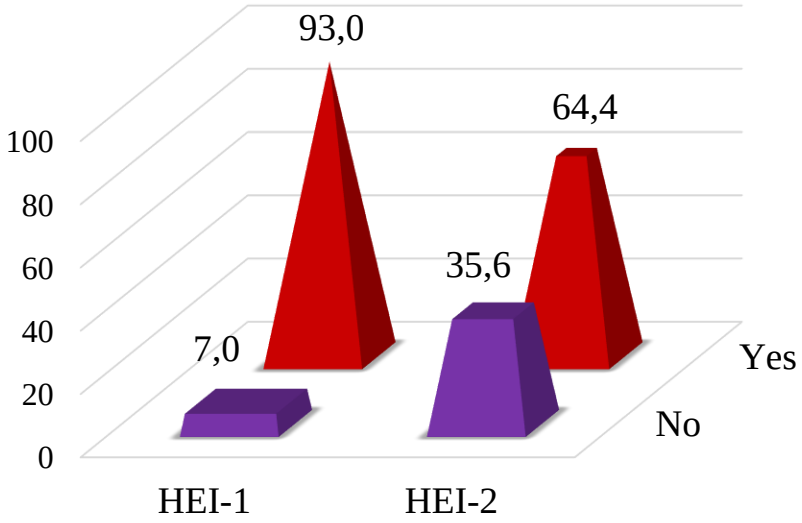


Figure 3. The distribution of respondents by the share of getting planned vaccination diseases in childhood against 10 (%).

Such a heterogeneous result of the vaccinated/unvaccinated part of respondents in both High Education Institutions logically implies the necessity of establishing the reasons for not carrying out the planned vaccination, which is presented in Fig. 4.

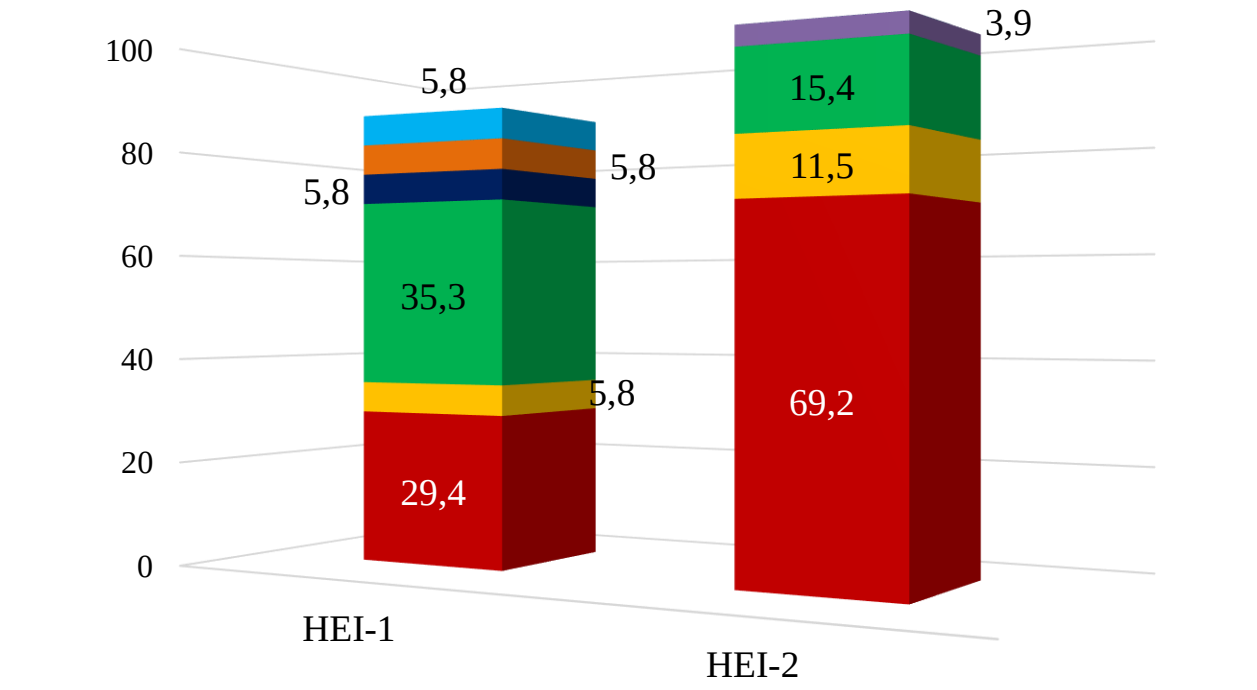


Figure 4. The reasons for refusing routine childhood vaccination (%).

The most significant indicators of the reasons for not carrying out routine children's vaccination are: 1) parental refusal, which reaches up to 70% (69,2%) in respondents of HEI-2 in contrast to the refusal rate in respondents of HEI-1 (29,4%); 2) intolerance to vaccination in respondents of HEI-1 make 35,3%; this indicator more than twice less (15,4%) in respondents of HEI-2. The frequency of adverse reactions and severe consequences after routine vaccination are presented in the diagrams in Fig. 5 and Fig. 6.

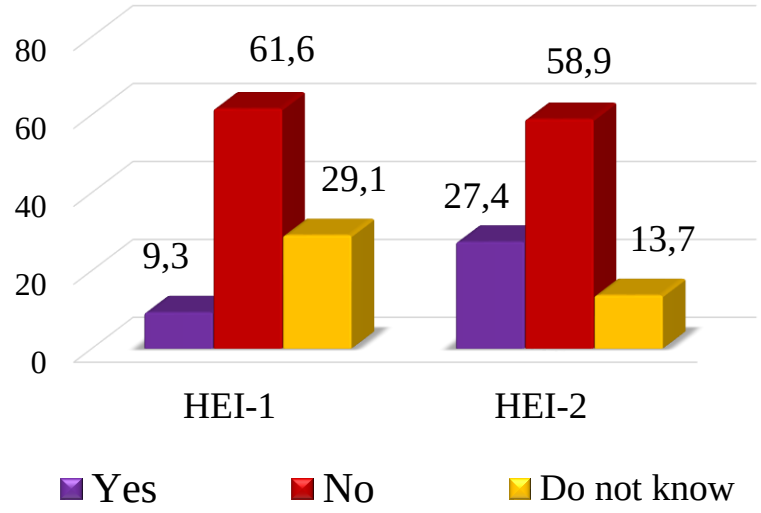


Figure 5. The frequency of adverse reactions after routine vaccination (%).

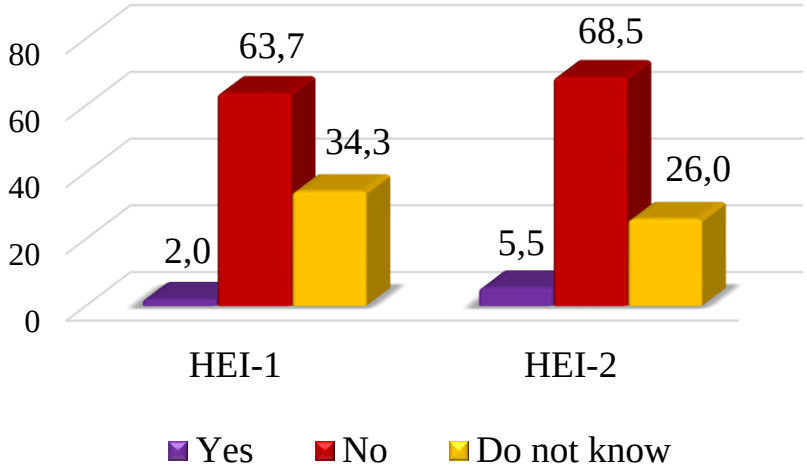


Figure 6. The frequency of severe consequences after routine vaccination (%).

As a result of the study, an extraordinary regularity was found: among the respondents of the HEI-2, side effects after vaccination occurred almost 4 times more often (9,3% *vs* 27,4%), leading to severe consequences nearly 3 times more often (2,0% *vs* 5,5%). Such differences can be interpreted and explained because respondents of HEI-2 as active or future health professionals have a higher level of empathy, which determines their professional orientation. At the same time, the probability of severe complications in the adverse reactions after vaccination is approximately the same in both groups of respondents .

A rather interesting result regarding the attitude to the planned vaccination of own existing and future children was also obtained, presented in the diagram in Fig. 7.

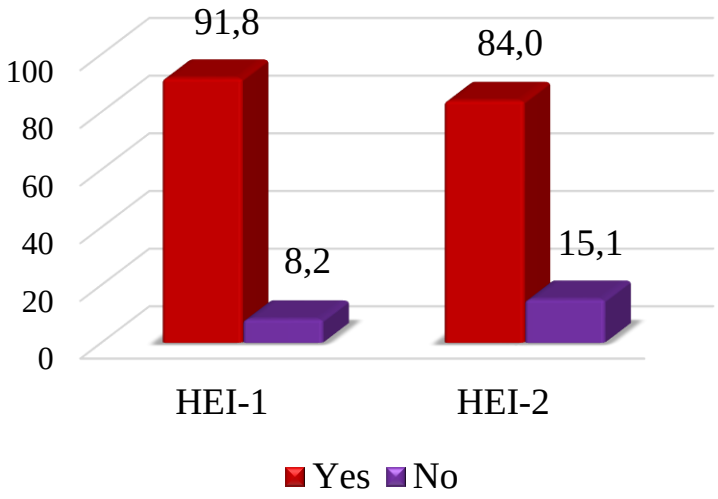


Figure 7. Respondents' opinions on the appropriateness of routine vaccination of their children (%).

The expected result was fewer HEI-2 respondents than the HEI-1 respondent (84,0% vs. 91,8%) who plan to carry out routine vaccination of their children, as they have more negative experiences of their childhood vaccination (Fig. 5, Fig 6).

The reasons for respondents' refusing the planned vaccination of their children in both High Education Institutions are presented in the diagrams in Fig. 8.

It should be noted that the developed questionnaire suggested only 5 main reasons for vaccinations refusal and proposed for respondents to provide their own reasons for refusal. The survey results showed that respondents additionally named seven more reasons for refusing to vaccinate their children. Among them: “I do not refuse” (2,6% HEI-1 *vs* 82,2% HEI-2), “I am unsure of the quality of vaccines currently available in Ukraine” (2,6% HEI-1), “I consider vaccination obligatory” (2,6% HEI-1), “Medical contraindications” (0,4% HEI-2), “Contraindications from physicians, distrust of the vaccine manufacturer, or insufficient information about the vaccine” (2,6% HEI-1), “I probably will not refuse” (2,6% HEI-1), “It all depends on the quality of the vaccine in the first place and the awareness of parents” (2,6% HEI-1).

The high correlation and reliability of the respondents' answers are evidenced by the high level of coincidence of the obtained results (Fig. 7) regarding the readiness

to vaccinate HEI-2 respondents (84,0%) and data (Fig. 8) on the reasons for refusing to vaccinate their children (82,2% "do not refuse").

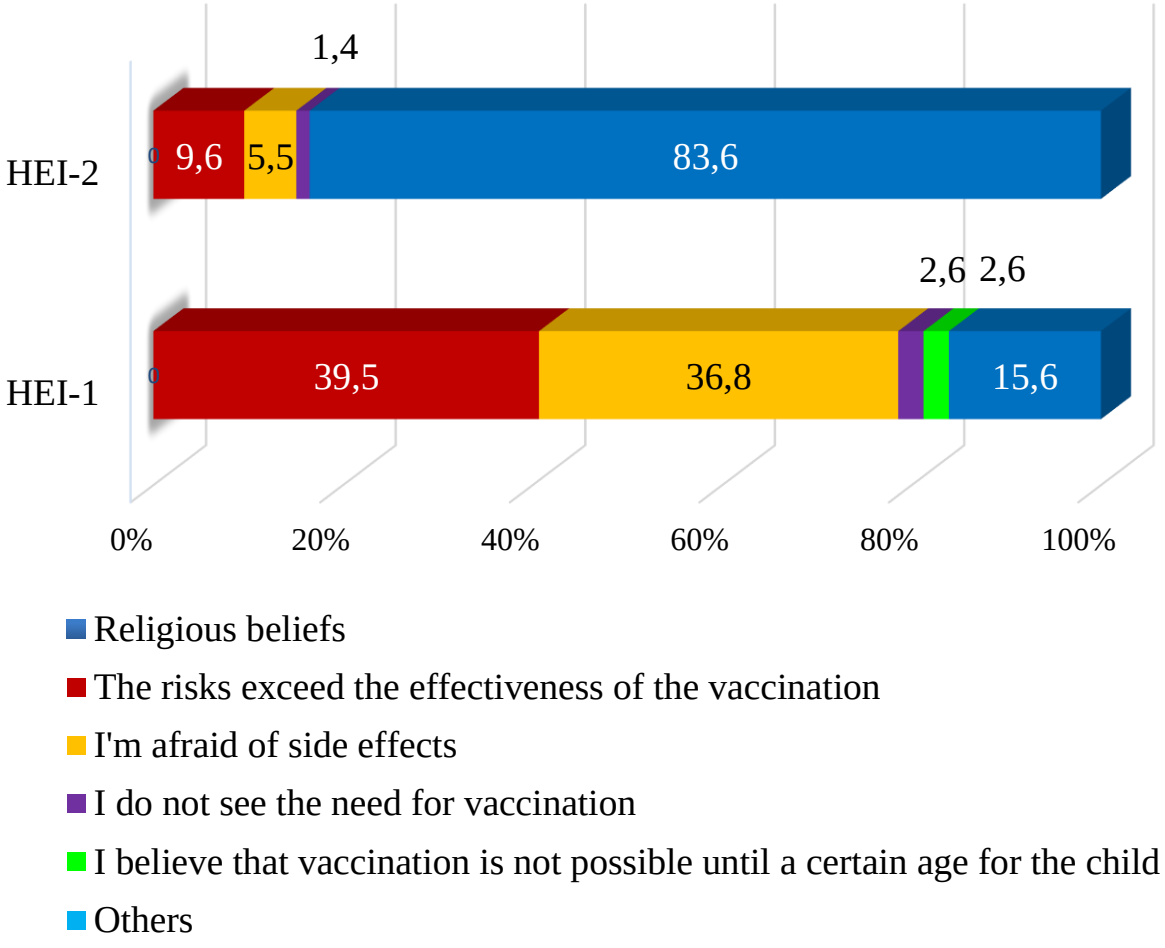


Figure 8. The reasons for respondents' refusing the planned vaccination of their children (%).

There is no such correlation in the answers of HEI-1 respondents, which can be explained, in our opinion, by the emergence of thinking about and predictions of their own choice for the future regarding the vaccination of their children during the survey.

The preference for the vaccination type by such a characteristic as financial compensation, namely the choice between paid and free vaccination, is presented in Fig. 9.

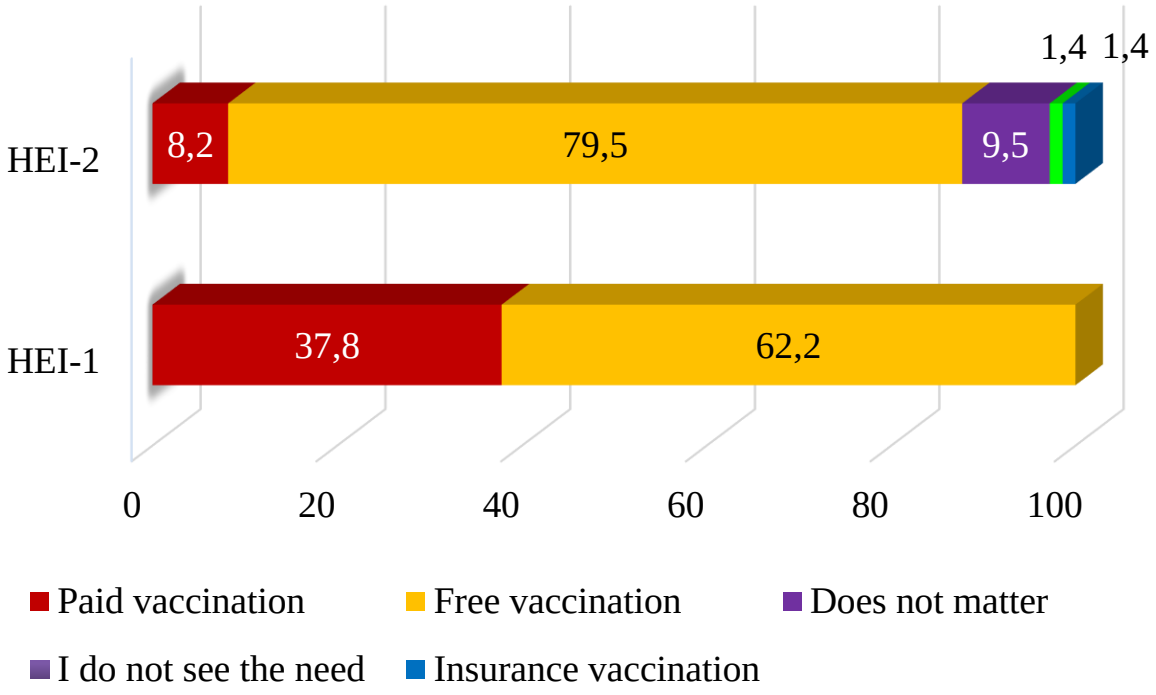


Figure 9. Respondents' opinions on the preference for the type of vaccination by the financial compensation (%).

Respondents of both institutions prefer free children vaccination. Still, they are also ready to pay for vaccines for children in some cases. Unfortunately, compulsory health insurance has not been introduced in Ukraine. Therefore, financial reimbursement of a particular choice of vaccines is possible only in the case of voluntary insurance of people through private insurance companies.

The basis of effective preventive measures, including those aimed at preventing infectious diseases, is to provide all members of the medical team, especially consumers of medical services, with up-to-date, qualified, reliable, evidence information about the vaccination process. Fig. 10 presents information about respondents' answers regarding the level of their awareness of the benefits of vaccinating children according to the vaccination calendar of Ukraine.

The questionnaire survey of respondents once again indicated the need for an even more detailed and in-depth study of the problems of childhood vaccination in Ukraine. It was difficult to predict that respondents of institution 2 (active and future healthcare professionals) would think that they poorly informed them about the benefits of children's vaccination (80,8%).

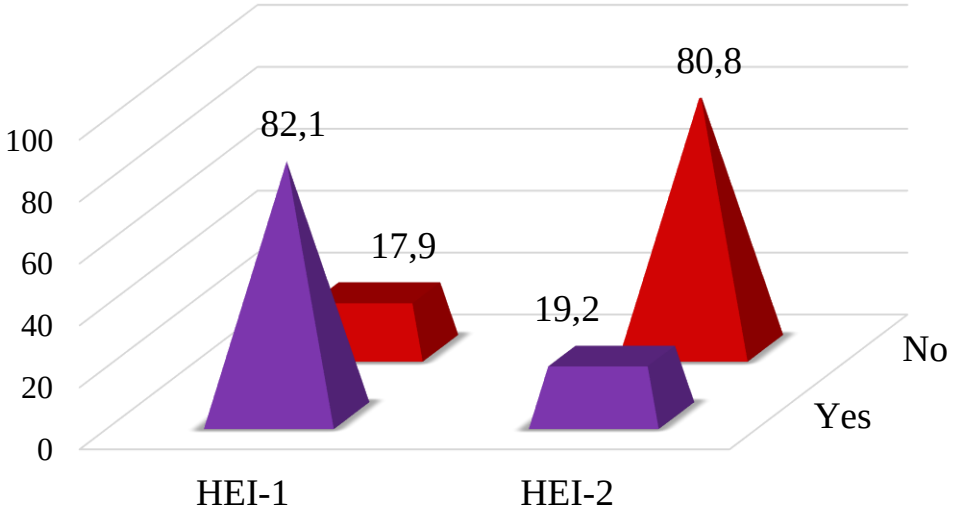


Figure 10. The level of respondents' awareness of the benefits of children's vaccination (%).

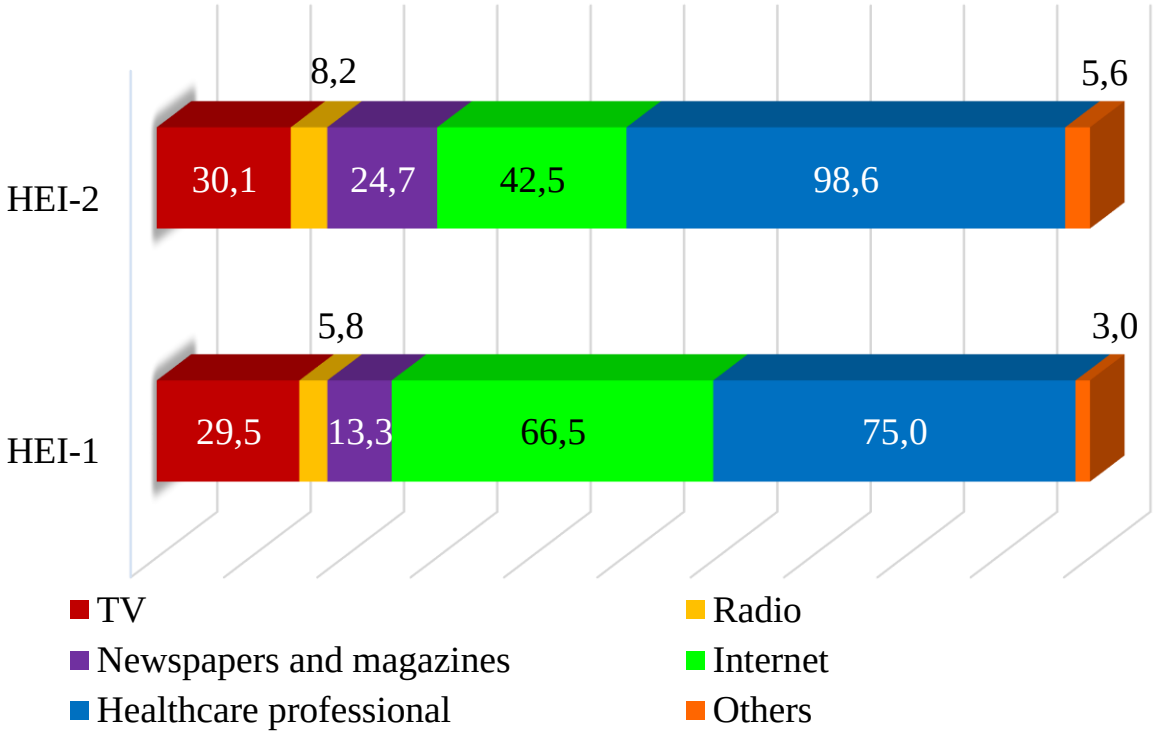
Respondents of institution 1 (active and future technician professionals), on the contrary, will think that they were well informed (82,1%) (Fig. 10). However, this trend can be explained by the fact that, according to human psychology, the more information a specialist receives, the more convinced of the inadequacy of this information.

Health awareness is part of the European Healthcare Strategy, which includes the knowledge and skills needed to understand, analyze and apply health information in making informed decisions about one's health in everyday life, including the vaccination process.

The distribution of respondents of both institutions by the priority sources of information on child vaccination is presented in Fig. 11.

The principal sources of information about vaccination, respondents of both High Education Institutions consider communication with healthcare specialists (75,0% of HEI-1 *vs* 98,6% of HEI-2), Internet sites (66,5% of HEI-1 *vs* 42,5% of HEI-2), and television (29,5% of HEI-1 *vs* 30,1% of HEI-2). Among other additional sources of information, the respondents of HEI-1 most often mentioned communication with school and kindergarten teachers (0,6% each), publications in official scientific journals (0,6%), and recommendations of relatives and friends

(1,2%). Respondents of HEI-2, as active and future healthcare professionals, logically consider evidence-based medicine and pharmacy to be essential sources of information (5,6%).



* *The total amount does not compose 100%, as respondents had the opportunity to choose several answers.*

Figure 11. The primary sources of information about vaccination according to respondents' opinions (%).

It is important to note that the respondents' answers at both institutions indicate a positive dynamics of changes in parents' attitudes towards granting permission to vaccinate children in the case of providing them with reliable (evidence) information about the vaccination process (Fig. 12).

However, the respondents of HEI-2 (30,1%) had more doubts about the positive change in their decision to children's' vaccination than those of HEI-1 (13,5%).

Responsible attitude to the protection of one's health and the health of one's children is critical, and it is vital in the period of the threat of exacerbation of infectious diseases. After all, due to the extraordinary burden on health care facilities caused by infectious diseases, any additional factors can lead to more severe consequences.

Therefore, understanding the importance of the problem, adequately addressing it, and ensuring timely vaccination is everyone's responsibility.

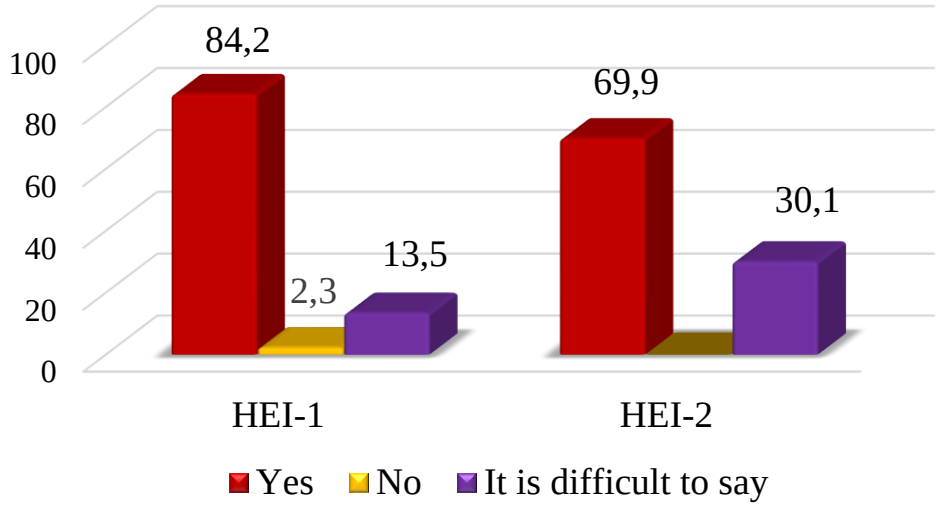


Figure 12. Readiness of respondents to permit vaccination of a child in case of receiving evidentiary information about the vaccination process (%).

The study results showed a sufficiently high level of respondents' understanding of the consequences of an outbreak of infection in the absence of vaccination (Fig. 13).

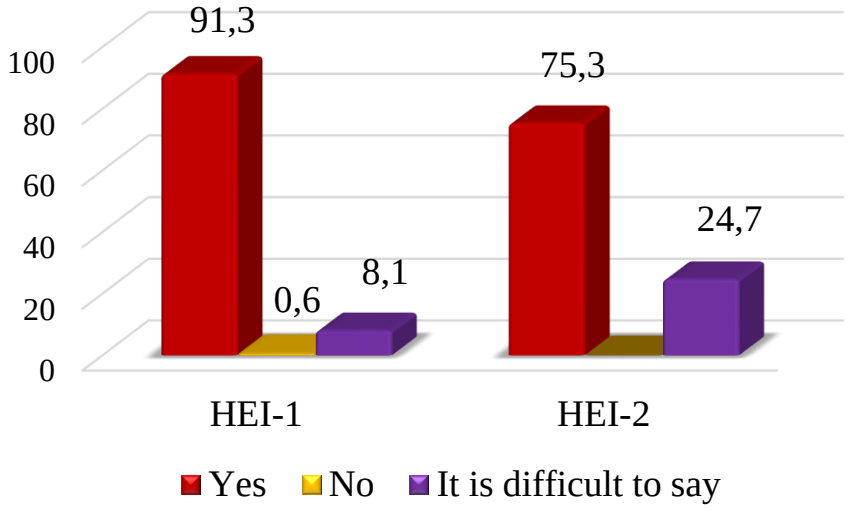


Figure 13. The level of respondents' understanding of the consequences of an outbreak of infection in the absence of vaccination (%).

Respondents also note the importance of communicating with healthcare professionals as a fundamental for raising respondents' awareness of issues related to the vaccination process (Fig. 14).

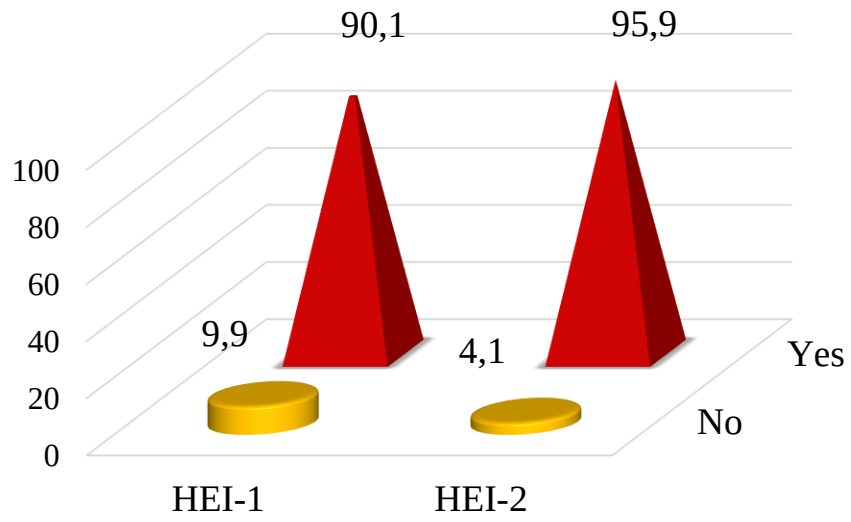


Figure 14. The distribution of respondents on their recognition of the need for communication with a healthcare professional to raise awareness about vaccination (%)

It should be noted that the survey results on respondents' understanding of the consequences of an outbreak of infection in the absence of vaccination and the distribution of respondents to recognize the need for communication with healthcare professionals to increase vaccination awareness were homogeneous.

According to the survey results, we conducted a SWOT analysis of the problems of childhood vaccination in Ukraine. The advantages and disadvantages, strengths and weaknesses, opportunities and threats have been identified. The strategies that medical and pharmaceutical professionals need to work on together in one team to address educational gaps in the proper vaccination of children have been developed.

Among the strategies we have developed are the following: 1) creating a program or website to inform parents about vaccination; 2) dissemination of information about the benefits and advantages of vaccination among the population; 3) conducting physical examinations of children with required tests for the vaccination's safety; 4) implementation of the state control on the provision of high-quality free vaccines; 5) performing communication between future parents and healthcare professionals about the necessity for child vaccination; 6) creation of rapid tests for vaccine tolerability; 7) designing an online vaccination schedule or a unique

application with notifications of vaccination dates for each child; 8) development of a quality system of free vaccination and raising the level of work of healthcare establishments; 9) strengthening the responsibility of parents for refusing to vaccinate their children; 10) ensuring the availability of quality vaccines at the state level.

Healthcare professionals' informational and educational activity (physicians, pharmacists, nurses, etc.) is an integral part of their professional responsibilities. It should cover the issue of children's vaccination, as the people's opinion formation is, unfortunately, affected mainly by inaccurate information from Internet resources. It is also essential to implement the developed and proposed strategies to promote children's vaccination among the population.