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Peculiarities of carrying out pre-vaccination diagnostics in Ukraine in order to determine the organism adaptability

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Abstract

This article focused on peculiarities of carrying out pre-vaccination diagnostics in Ukraine in order to determine the organism adaptability.

Aims: The aims of this study are to investigate the peculiarities of performing pre-vaccination diagnostics in Ukraine to ascertain the adaptability of the organism.

Methodology: A descriptive cross-sectional study design was used. Secondary data was utilised and analysed. Descriptive statistics obtained and utilised

Results: showed that Ukraine has over 4,000 registered microbiological laboratories, but only 2 are allowed to work with microorganisms of the first pathogenic group, 402 with the second, and all others with the third and fourth. The relevant information indicates that there are no BSL-4-compliant laboratories in Ukraine. The barriers and facilitators are such as organisational, logistical, and resource-related challenges, as well as factors that promote or delay the use of diagnostic tests in the vaccination process. In 2021, 88.5% of individuals received the first dose of the measles vaccine, while in 2020 and 2019 the coverage rates were 84.9% and 93.2%, respectively. Similarly, for the second dose of the measles vaccine, the coverage rates were 85.9%, 81.9%, and 91.7% in 2021, 2020, and 2019, respectively. Among the reasons, the desire to protect oneself (63.6%) and to others (12.5%) were the most frequent justifications for vaccination; 12.8% of respondents chose to be vaccinated for employment-related reasons. As the study found among other reasons there was the lack of awareness and knowledge about the importance of pre-vaccination diagnostics among healthcare providers and the general public, a significant barrier to compliance with national and international guidelines.

Scientific Novelty: Pre-vaccination diagnostic peculiarities

Conclusion: The research findings suggest that there may be peculiarities in the implementation of pre-vaccination diagnostics in Ukraine, with potential challenges related to adherence to established guidelines, stakeholder perspectives, and organisational factors.

Keywords: Pre-vaccination, Diagnostics, Adaptability, Organism, Ukraine, Peculiarities.

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Introduction

Vaccination is a critical technique for preventing the spread of infectious diseases and protecting public health. Pre-vaccination diagnostics must be carried out to ascertain the adaptability of the recipient's organism before vaccinations are given. These tests include the serological tests, molecular tests, Skin tests, Antigen tests and others. These reduces the possibility of negative responses while assisting in ensuring the vaccine's effectiveness and safety. In Ukraine, pre-vaccination diagnostics are a critical component of the immunisation program. More than 20 lethal illnesses may now be prevented with vaccinations. Vaccinations currently save 3.5-5 million lives each year from diseases such as measles, diphtheria, tetanus, pertussis, and influenza [1].

Ukrainian diagnostic facilities availability in order to determine the adaptability of the organism provide information on immunological considerations for vaccine strategies [2,3], the use of diagnostic testing to make vaccination programs more effective [4-5], and checklists for COVID-19 vaccination [6]. Additionally, the FDA closely monitors vaccine

development and safety through various surveillance systems [7], and vaccines typically contain an active component that generates an immune response [8].

Ukraine's national immunisation program covers a broad variety of diseases, including measles, polio, hepatitis, and influenza [9]. According to UNICEF, 10,682,752 persons in Ukraine have gotten at least one dose of the COVID-19 vaccine, and 7,596,587 were given two doses and are fully protected. For practical public health considerations for the prevention and management of infectious diseases, The Lancet provides information on the pre-war health burden of Ukraine [10].

As of the month of February in the year 2022, almost 31 million doses of vaccination had been distributed across Ukraine. There is a problem in Ukraine with vaccine reluctance since just 53% of Ukrainians have been immunised against polio. The Centers for Disease Control and Prevention advises unvaccinated travellers under 60 who are visiting Ukraine to acquire the hepatitis B vaccine [11].

17.2% of persons were vaccinated with AstraZeneca, 29.6% were vaccinated with Coronovac, 41.7% were vaccinated with Pfizer-BioNTech, and 11.5% were vaccinated with Moderna, according to a study from November 2021 [12–14]. However, there is a problem in Ukraine with people being reluctant to be vaccinated, since just 53 percent of the population has been immunised against polio. According to recent research conducted by UNICEF, 42 percent of Ukrainians who have not had the COVID-19 vaccination are open to receiving it [15]. Unvaccinated travellers under the age of 60 who are going to Ukraine are encouraged by the Centers for Disease Control and Prevention to be vaccinated against hepatitis B.

Vaccinations are routinely administered in accordance with the immunisation schedule in Ukraine. The vaccination schedule defines the exact vaccinations that are to be provided at various ages, and pre-vaccination diagnostics are carried out to confirm that recipients are eligible for immunisation based on their current state of health and their medical history [16].

In Ukraine, pre-vaccination diagnostics helps in checking for contraindications. Severe allergic responses, immunodeficiency, pregnancy, or an acute sickness are a few examples of contraindications. It's crucial to screen for contraindications to find people who may not be a good candidate for vaccination or who might need extra care. In Ukraine, there is a widespread immunisation program that protects against illnesses including measles, polio, hepatitis, and influenza. Only 53% of Ukrainians have had a polio vaccine, raising concerns about vaccine reluctance in that country [17].

Pre-vaccination diagnostics in Ukraine also include testing that is performed in the laboratory. It is possible that blood tests will be required to screen for immunity levels, such as antibodies against a certain illness, in order to establish whether or not the vaccination is required [18] and place a significant emphasis on the monitoring of patients for the occurrence of adverse effects after immunisation. This information is used to evaluate the safety of vaccinations [19].

The pre-vaccination diagnostics process is affected because of limited access to healthcare services, inadequate laboratory facilities, a lack of awareness and education among healthcare providers and the community about the importance of pre-vaccination diagnostics, as well as variations in vaccine availability and administration practices across different regions of Ukraine. Vaccines are also administered differently depending on the region of Ukraine [20].

The pre-vaccination diagnostics in Ukraine are a crucial part of the whole vaccination procedure. They are carried out to evaluate the degree to which the recipient's body can adapt to the vaccine and to guarantee that vaccinations are provided in a manner that is both safe and effective. The pre-vaccination diagnostics continue to play an important part in preserving public health and halting the development of infectious illnesses in Ukraine, despite the difficulties and factors that must be taken into account. It is necessary to do further research and make additional efforts in order to improve the execution of pre-vaccination diagnostic and guarantee that vaccination programs are implemented effectively throughout the whole country.

Research Problem

Our research problems may be the following:

1. Access and availability of healthcare services, laboratory facilities and testing
2. Awareness and Education
3. Vaccination coverage, contraindication screening and vaccine adverse event monitoring

There are many research issues surrounding the pre-vaccination diagnostics in Ukraine, including access to healthcare services, knowledge and education, laboratory supplies and testing, contraindication screening, vaccine adverse event monitoring, geographic variations, and effects on vaccination coverage. The deployment of pre-vaccination diagnostics may be strengthened, and vaccination programs in Ukraine can be made safer and more successful by tackling these research issues via thorough study.

Research Focus

The research should target the following key areas, including assessment of current practices, identifying barriers and facilitators, evaluating the impact on vaccination outcomes, developing Interventions, and policy implications. The research should focus on the peculiarities of performing the pre-vaccination diagnostics to determine the adaptability of the organism in Ukraine. In conclusion, research on the distinctive methods of pre-vaccination diagnostics to ascertain the adaptability of the organism in Ukraine should include assessment of current practices, identification of challenges and enablers, assessment of impact on vaccination outcomes, development of interventions, and informing policy development.

Research Aim and Research Questions

The aims of this study are to investigate

1. Current practices of pre-vaccination diagnostics.
2. Barriers and facilitators to pre-vaccination diagnostics.
3. Compliance with national and international vaccination guidelines.
4. Knowledge, attitudes, and practices of stakeholders.

Research Questions

1. What are the existing norms for pre-vaccination diagnostics in Ukraine, particularly the accessibility and calibre of laboratory resources, adherence to screening protocols for contraindications, and observation of adverse reactions to vaccination?
2. What are the vaccination results in Ukraine, such as vaccine acceptability, uptake, and coverage rates, affected by pre-vaccination diagnostics?

Research Methodology

General Background

To stop the spread of infectious illnesses and safeguard the community health, vaccine research is crucial. Vaccination programs are intended to provide protection against certain illnesses by inducing an immunological response from the body without actually transmitting the disease. Pre-vaccination diagnostics, often referred to as pre-vaccination screening or evaluation, are a crucial stage in the vaccination process to analyze how well a person's body will respond to the vaccine.

Due to a variety of issues, such as disparities in healthcare infrastructure, resources, cultural attitudes, and socioeconomic considerations, the implementation of pre-vaccination diagnostics in Ukraine may encounter anomalies or particular problems. For pre-vaccination diagnostics to be implemented as effectively as possible and for Ukraine's vaccination programs to be successful, it is crucial to comprehend these differences.

Research on the unique aspects of performing pre-vaccination diagnostics in Ukraine may add to the body of knowledge in this area and provide light on present procedures, difficulties, and areas for development. With the use of such research, evidence-based strategies and policies may be developed to increase the use of pre-vaccination diagnostics, streamline vaccination campaigns, and boost public health outcomes in Ukraine.

Sample / Participants / Group

Individuals who are eligible for immunization in Ukraine, including children, adolescents, adults, and the elderly, would make up the sample/participants/group for this research study. In terms of age, gender, geography, and vaccination status, the sample/participants/group would probably be heterogeneous.

Instrument and Procedures

The research study may utilize a combination of quantitative and qualitative research methods, depending on the research questions and aims. The research study may involve the following procedures:

Data Analysis

Data collection: A pretested questionnaire was utilized to collect the secondary data from the document related to vaccination policies, guidelines, and reports. Data was analyzed using descriptive and inferential statistical methods, such as frequencies, percentages, to examine the current practices and outcomes of pre-vaccination diagnostics.

Research Results

Current practices of pre-vaccination diagnostics

The results from (Table 1) show that Ukraine has over 4,000 registered microbiological laboratories, but only 2 are allowed to work with microorganisms of the first pathogenic group, 402 with the second, and all others with the third and fourth. That's why Ukraine's official categorisation of high-containment labs includes those that operate with first- and second-pathogenic microorganisms [21].

Table 1. Current Practices of Pre-Vaccination Diagnostics in Ukraine

Variable	Frequency
Availability of Laboratory Facilities	(402)
First group Lab	(02)
2 nd group Lab	(402)
3 rd & 4 th group	(3596)
BSL4	(0)
Adherence to Contraindication Screening Guidelines	(WHO, CDC)
Monitoring of Adverse Events Following Vaccination	(WHO, CDC)

Source: Authors' development based on The National Academies Press n.d.

Results also demonstrate careful adherence to contraindication screening guidelines of WHO and CDC. A vaccination schedule for Ukraine from the WHO website is used to determine vaccine timing and kinds [22]. The Centers for Disease Control and Prevention (Ukraine), website of the World Health Organization offers screening checklists and a global manual on surveillance of adverse events following immunisation, which offers instructions on monitoring and reporting AEFI [23-24]. The information at hand indicates that there are no BSL-4-compliant laboratories in Ukraine. In order to reduce the possibility of an unintentional release, the World Health Organisation encouraged Ukraine to get eliminate of the high-threat viruses that were still present in the nation's public health labs. Despite the effect of the ongoing war on crucial medical services and supplies, the Ukrainian health system is nonetheless resilient [25]. The condition of the availability and calibre of laboratory facilities for performing pre-vaccination diagnostics, including the accessibility of essential equipment, qualified employees, and resources in Ukraine, is not up to global standard [26].

According to Ukrainian research, various systemic weaknesses are indicated by current pre-vaccination diagnostic techniques. The accessibility and quality of testing facilities, the detection of contraindications, and the monitoring of adverse responses to immunisations are all reportedly issues. These findings suggest that the current system need improvement.

Barriers and facilitators to pre-vaccination diagnostics

The results (Table 2) uncovered the barriers and facilitators to the implementation of pre-vaccination diagnostics in Ukraine, such as organisational, logistical, and resource-related challenges, as well as factors that promote or hinder the use of diagnostic tests in the vaccination process [26–28].

Table 2. Barriers and facilitators to pre-vaccination diagnostics

Variable	Barriers	Facilitators
Healthcare Providers	Limited access to diagnostic facilities, Lack of awareness among patients and providers	Clear guidelines and protocols, Training and education for healthcare providers
Public Health Officials	Limited resources and logistical in remote areas	Government support and funding Strong collaboration and coordination among stakeholders
Laboratory Personnel	Lack of standardized protocols and guidelines Limited resources and infrastructure	Quality assurance programs and proficiency testing technical training and support for laboratories

Source: Authors' development based on Essential Programme on Immunization n.d.

Organisational barriers are related to the coordination, management, and include an absence of clear guidelines and protocols for the use of diagnostic tests in the vaccination process and fragmented healthcare system due to decentralised healthcare system, with multiple stakeholders involved in the vaccination process [29]. Logistical challenges refer to issues related to the availability, storage, transportation, and distribution of diagnostic tests [29].

Resource-related challenges include issues such as limited funding and budget constraints. Results also showed that among the factors that can promote the use of diagnostic tests in the vaccination process in Ukraine are, evidence-based guidelines and protocols, strong leadership, effective coordination among healthcare providers, and adequate training and capacity-building, leveraging existing healthcare infrastructure and resources, such as utilising established laboratory networks or leveraging digital health technologies for data management and reporting [30].

The findings highlight organisational, logistical, and resource-related difficulties in conducting pre-vaccination diagnostics in Ukraine. Organisational obstacles include a disjointed healthcare system with many stakeholders and a lack of defined norms and practices. The restricted availability of diagnostic tests and the need for a cold chain are logistical problems, while financing and budget restrictions are resource-related challenges. Evidence-based recommendations, strong leadership, efficient coordination among healthcare practitioners, and the utilisation of already-existing healthcare infrastructure and resources are all factors that might encourage the use of diagnostic testing throughout the immunisation process.

Compliance with national and international vaccination guidelines

The results from (Table 3) of the available statistics showed that the year 2021, 88.5% of individuals received the 1st dose of the measles vaccine, while in 2020 and 2019, the coverage rates were 84.9% and 93.2%, respectively. Similarly, for the 2nd dose of the measles vaccine, the coverage rates were 85.9%, 81.9%, and 91.7% in 2021, 2020, and 2019, respectively. The BCG vaccine coverage rates were 86.5%, 92.7%, and 83.8% in 2021, 2020, and 2019, respectively.

Table 3. Vaccinations Coverage from 2019 to 2021

Vaccination Name	2021
Corona full vaccination 18-59 years	46%
Corona full vaccination 60 years & above	33%
Corona Booster Vaccination 18-59 years	2%
Corona Booster Vaccination 60 years & above	2%
Measles-containing vaccine, 1st dose	88.5%
Measles-containing vaccine, 2nd dose	85.9%
BCG	86.5%
DTP-containing vaccine, 1st dose	90.8%
DTP-containing vaccine, 3rd dose	78.1%
Hib, 3rd dose	87.2%
HepB, 3rd dose	77%
HepB, birth dose (given within 24 hours of birth)	56.3%
HepB, birth dose total (including those given within and after 24 hours of birth)	90.4%
Influenza child age group 1	0.27%
Influenza child age group 2	0.68%
Polio, 3rd dose	78.3%
Rubella-containing vaccine, 1st dose	88.5%

Source: Authors' development based on WHO Immunization Data portal n.d.

For the DTP-containing vaccine, the coverage rate for the first dose was 90.8%, 92.6%, and 88.9% in 2021, 2020, and 2019, respectively. However, for the third dose, the coverage rates were 78.1%, 81.3%, and 79.9% in 2021, 2020, and 2019, respectively. The coverage rate for the 3rd dose of Hib vaccine was 87.2%, 85.2%, and 80% in 2021, 2020, and 2019, respectively. The Hepatitis B vaccine coverage rate at birth was 90.4% and 100% in 2021 and 2020, respectively. The coverage rate for the 3rd dose of polio vaccine was 78.3%, 84.2%, and 77.8% in 2021, 2020, and 2019, respectively. For the 1st dose of rubella vaccine, the coverage rates were 88.5%, 84.9%, and 93.2% in 2021, 2020, and 2019, respectively. Corona full vaccination 18-59 years 46% full vaccination and 2% booster dose while Corona full vaccination 60 years and above 33% full vaccination and 2% booster dose [31].

Results (Table 4) showed the extent to which healthcare providers and laboratories in Ukraine comply with National and international guidelines for pre-vaccination diagnostics, the availability and accessibility of diagnostic tests, quality assurance measures, Strengthening data reporting mechanisms, High level of awareness, Training and education, Laboratory infrastructure and equipment requirements are followed as per national and international guidelines for pre-vaccination diagnostics, such as those recommended by the World Health Organisation (WHO) or other relevant authorities [32–34].

Table 4. Compliance with national and international guidelines

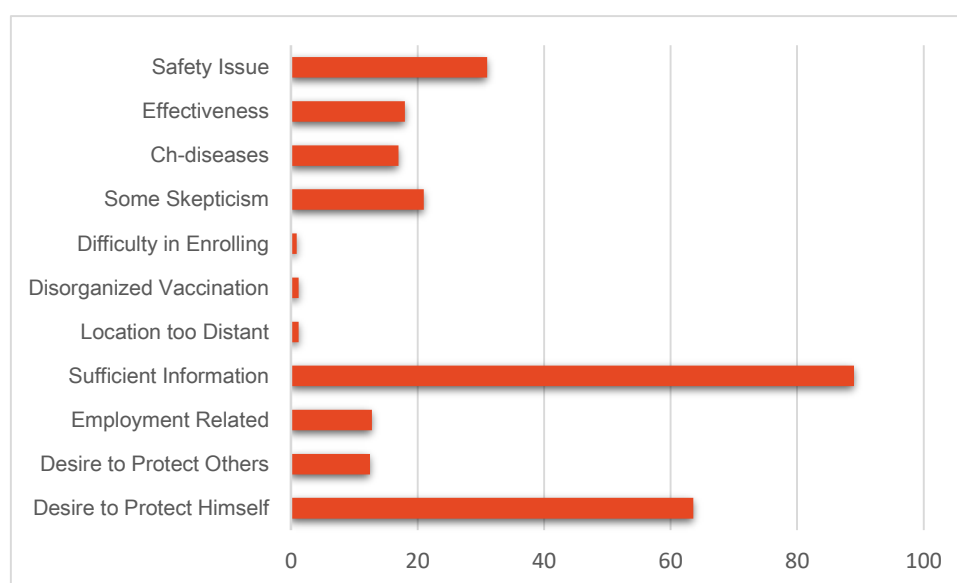
Variables Area of Compliance
National and international guidelines for pre-vaccination diagnostics
Enhancing the availability and accessibility of diagnostic tests
Improving quality assurance measures,
Strengthening data reporting mechanisms
High level of awareness
Training and education
Laboratory infrastructure and equipment requirements

Source: Authors' development based on National Library of Medicine n.d.

These studies highlight the importance of assessing the compliance of healthcare providers and laboratories in Ukraine with national and international guidelines for pre-vaccination diagnostics. Identifying areas of non-compliance can help inform strategies for improvement, such as enhancing the availability and accessibility of diagnostic tests, improving quality assurance measures, and strengthening data reporting mechanisms. Aligning Ukrainian practices with established guidelines can contribute to the effective implementation of pre-vaccination diagnostics and enhance the overall vaccination process.

Knowledge, attitudes, and practices of stakeholders

Results (Figure 1) examined the knowledge, attitudes, and behaviours of health care professionals, patients and co-workers.

**Figure 1.** Knowledge, attitudes, and practices of stakeholders

Source: Authors' development based on COVID-19 KAP n.d.

Total participants were 1390 out of them being women and 21.7% being males and the majority, were over 65 years old and Ukraine's 18 regions were covered. Among the reasons, the desire to protect oneself (63.6%) and to others (12.5%) were the most frequent justifications for vaccination; 12.8% of respondents chose to be vaccinated for employment-related reasons, 89% of respondents claimed to have gotten sufficient information prior to vaccination, 8% complained that they had no information, and 3% were unsure of their response. Four out of seven respondents who accepted vaccination due to job security also said that they were at danger of losing their employment if they declined. Amongst them 95.8% of respondents said they had no trouble getting their shots, while 1.2% said the vaccination locations were too distant from their homes, 1.2% of participants saw a generally disorganized vaccination site, 0.9% reported trouble enrolling for vaccinations, 0.9% complained about uncomfortable work hours and lengthy lines, 21% expressed some scepticism; and 3% did not reply. The effectiveness of the vaccination (18%), current chronic conditions and contraindications (17%), as well as side effects and vaccine safety (31%), were often raised as concerns by respondents [35]. A connected study discovered, among other things, a lack of awareness and knowledge about the

necessity of pre-vaccination diagnostics among healthcare practitioners and the general public, which is a significant barrier to complying with national and international requirements [36]. A recent study conducted on vaccination issues, beliefs, and practices among Ukrainian migrants has highlighted the necessity of identifying their attitudes and practices towards vaccination in order to enhance their vaccination coverage [25-36]. With more than 50% of Ukrainians believing that vaccines have not been adequately studied, vaccine hesitancy is a serious problem in that country. The WHO European Region's current vaccination coverage rates are insufficient to provide protection and halt the spread of diseases that can be prevented by vaccination. Vaccine hesitancy, which is driven by a variety of factors including lack of trust in the vaccine or provider, no perceived need for a vaccine, and access concerns, is a barrier to achieving high vaccination uptake [37].

The research discovered that healthcare professionals and the general population in Ukraine lack understanding and information about the value of pre-vaccination diagnostics, which is a major obstacle to adhering to national and international norms. More than 50% of Ukrainians believe that vaccinations have not been adequately evaluated, which contributes to the WHO European Region's poor immunization coverage rates. Vaccine hesitancy is a serious problem in Ukraine. The lack of faith in the vaccine or the provider, the absence of a perceived necessity for a vaccine, and access concerns are obstacles to achieving high vaccination uptake in Ukraine.

Discussion

Current practices of pre-vaccination diagnostics

The findings from the study in Ukraine highlight several important issues related to pre-vaccination diagnostics. One key issue is the limited availability and quality of laboratory facilities in the country. The study revealed that out of over 4,000 registered microbiological laboratories in Ukraine, only 2 are allowed to work with microorganisms of the first pathogenic group, and 402 with the second, while the rest work with the third and fourth groups. This suggests that Ukraine's official categorisation of high-containment labs may not align with international standards, as laboratories that are permitted to work with first-pathogenic microorganisms in Ukraine may not be equivalent to BSL-4 or BSL-3 labs found in other countries. There are only two such facilities in India, the National Institute of Virology in Pune, which is a facility specifically designed to investigate human viruses, and the High Security Animal Disease Laboratory in Bhopal, which is a facility specifically designed to study animal infections, according to a study conducted there [38]. Similarly, there are just four BSL-4 laboratory suites that are currently in use in the United States [39].

Furthermore, the study highlighted the importance of adhering to contraindication screening guidelines before administering vaccinations. The study mentioned the use of vaccination contraindication and precaution screening guidelines established protocols. These all follow the CDC's standard recommendations to make vaccinations as safe and effective as possible. Assessment of patient immunisation status and determination of necessary vaccines, screening for precautions and contraindications, patient education, correct preparation and administration of vaccines, and documentation of the vaccines provided are all steps in the administration process. When applicable, organisational policies and procedures, manufacturer directions, and professional standards for pharmaceutical administration should always be followed [40]. Numerous investigations show that the majority of clinical laboratories in developing nations are of poor quality. For instance, the majority of clinical laboratories in Africa do not adhere to international standards because there are insufficient funds, appropriate rules, and a supportive healthcare system [41].

Ukrainian research found that the pre-vaccination diagnostic procedures used today indicate certain systemic flaws. According to the report, there are problems with testing facility accessibility and quality, with screening for contraindications and with keeping track of adverse reactions to vaccinations. These results imply that the present system needs to be improved. The results of the research conducted in Ukraine show how few labs are authorised to operate with higher-pathogenic microorganisms, as well as how poor the quality of those that is available. This raises questions about how well Ukraine's lab classification adheres to global norms. In accordance with international norms and CDC recommendations, emphasis was placed on following the contraindication screening procedures before providing immunisations. The research also uncovered widespread problems with facility accessibility, contraindication screening, and adverse reaction monitoring in pre-vaccination diagnostic practices. These findings highlight the need of strengthening Ukraine's present system in order to guarantee secure and efficient immunisation procedures.

Barriers and facilitators to pre-vaccination diagnostics

The results uncovered the barriers and facilitators to the implementation of pre-vaccination diagnostics in Ukraine, such as organisational, logistical, and resource-related challenges, as well as factors that promote or hinder the use of diagnostic tests in the vaccination process [26-28]. Organisational barriers are related to the coordination, management, and administration of pre-vaccination diagnostics and the key organisational challenges include an absence of clear guidelines and protocols for the use of diagnostic tests in the vaccination process and fragmented healthcare system due to decentralised healthcare system, with multiple stakeholders involved in the vaccination process [29]. Logistical challenges refer to issues related to the availability, storage, transportation, and distribution of diagnostic tests. In Ukraine, some of the key logistical challenges include limited availability of diagnostic tests and cold chain requirements [29]. Resource-related challenges can also be a barrier in pre-vaccination diagnostics implementation in Ukraine and

include issues such as limited funding and budget constraints. Results also showed that among the factors that can promote the use of diagnostic tests in the vaccination process in Ukraine are, evidence-based guidelines and protocols, strong leadership, effective coordination among healthcare providers, and adequate training and capacity-building, leveraging existing healthcare infrastructure and resources, such as utilising established laboratory networks or leveraging digital health technologies for data management and reporting [30]. Uncertainty about the safety and effectiveness, a lack of faith in those factors, and a lack of safety and effectiveness evidence were among the hurdles identified by a different study. In a similar vein, it discovered facilitators such as healthcare professionals' recommendations, news from television, radio, and newspapers as primary sources of information, vaccine-related health education provided by healthcare professionals, and Expectation of returning to a normal social life by receiving all recommended vaccinations [42–44].

The research in Ukraine found both facilitators and obstacles to the use of pre-vaccination diagnostics. Organisational obstacles include a fragmented healthcare system brought on by decentralisation and a lack of defined norms and practices. Limited diagnostic test availability and cold chain needs are two logistical issues. Budget restrictions and a lack of money are resource-related issues. On the other hand, enablers include using current healthcare infrastructure and digital health technology for data management, strong leadership, and efficient coordination among healthcare practitioners, proper training, and evidence-based recommendations. The need for precise standards and procedures, enhanced stakeholder coordination, expanded diagnostic test accessibility, resolving budget limitations, and improving vaccine-related health education via various public awareness channels are just a few of the recommendations. The findings highlight organisational, logistical, and resource-related difficulties in conducting pre-vaccination diagnostics in Ukraine. Organisational obstacles include a disjointed healthcare system with many stakeholders and a lack of defined norms and practices. The restricted availability of diagnostic tests and the need for a cold chain are logistical problems, while financing and budget restrictions are resource-related challenges. Evidence-based recommendations, strong leadership, efficient coordination among healthcare practitioners, and the utilization of already-existing healthcare infrastructure and resources are all factors that might encourage the use of diagnostic testing throughout the immunisation process.

Compliance with national and international vaccination guidelines

The World Health Organisation's standards for herd immunity against serious illnesses have not been satisfied by Ukraine, which has one of the lowest vaccination rates in Europe. In 2021, 13% of Ukrainian children and 20% of adults lacked the poliovirus vaccine and adequate measles immunization, respectively. In contrast, measles vaccination rates ranged from 80.3% to 99.8% in other European nations like Hungary, Portugal, Russia, Turkey, Finland, and Poland in the same year. In order to eradicate the disease and stop its spread to at-risk groups, Hungary, in particular, immunizes almost all of its children against measles. To develop herd immunity, the WHO recommends that at least 95% of the population take the measles vaccine [45-46].

Europe was deemed polio-free by the World Health Organisation in 2002. But to keep this status, youngsters must continue to receive vaccinations. In 2018, Hungary had 99.9% of children vaccinated against polio, while Turkey had a polio vaccination rate of 98%. In stark contrast, just 71% of children in Ukraine were immunised against polio that year [47]. Low vaccination rates in Ukraine are the result of a number of issues, including widespread vaccine reluctance, which has been exacerbated in part by social media campaigns that propagate false information about vaccines and erode public confidence in Ukrainian institutions.

Low vaccination rates in Ukraine have led to disease outbreaks that could have been stopped. With almost 115,000 cases and 40 recorded fatalities, Ukraine saw the worst measles outbreak in Europe between 2017 and 2020. A type 2 vaccine-associated paralytic poliovirus epidemic was identified in 2021, with two cases of acute flaccid paralysis and more than 20 children testing positive for the virus. Measles outbreaks increased in other European nations in 2017 and 2018, with about 3,500 cases, but in Ukraine, rates peaked in 2019 at a significantly lower rate. However, there has been a recent increase in measles infections, which may be related to the widespread anti-vaccination attitudes in some European nations. It is significant to note that the monthly reported cases of [48].

This also showed the extent to which healthcare providers and laboratories in Ukraine comply with National and international guidelines for pre-vaccination diagnostics, the availability and accessibility of diagnostic tests, quality assurance measures, Strengthening data reporting mechanisms, High level of awareness, Training and education, Laboratory infrastructure and equipment requirements are followed as per national and international guidelines for pre-vaccination diagnostics, such as those recommended by the World Health Organisation (WHO) or other relevant authorities. These studies highlight the importance of assessing the compliance of healthcare providers and laboratories in Ukraine with national and international guidelines for pre-vaccination diagnostics. Identifying areas of non-compliance can help inform strategies for improvement, such as enhancing the availability and accessibility of diagnostic tests, improving quality assurance measures, and strengthening data reporting mechanisms. Aligning Ukrainian practices with established guidelines can contribute to the effective implementation of pre-vaccination diagnostics and enhance the overall vaccination process.

Knowledge, attitudes, and practices of stakeholders

A total of 1390 people from Ukraine's 18 regions participated in the survey; the majority of them were women (78.3%), and 53.4% of them were over 65. Participants came from all regions of Ukraine, with the Eastern and Western regions having the most presence. The desire to protect oneself (63.6%) and others (12.5%) were the most common motivations for vaccination, whereas 12.8% of respondents decided to get vaccinated for employment-related reasons. Information received prior to vaccination: 89% of respondents said that they felt they had gotten enough information, 8% said they had not, and 3% were unclear. The majority of respondents (95.8%) said they had no problem obtaining their injections; however some said they had difficulties enrolling in vaccinations (0.9%) or travelling to far-off vaccination places (1.2%). Concerns regarding vaccination efficacy (18%), present chronic diseases and contraindications (17%), side effects and vaccine safety (31%) and current chronic conditions were also brought up by respondents. The identification of vaccine hesitancy as a key obstacle to high vaccination uptake in Ukraine revealed that it was affected by mistrust, a false perception of necessity, and access problems. It was determined that a key obstacle to following recommendations is the lack of awareness and understanding regarding pre-vaccination diagnostics among healthcare professionals and the general population. To boost vaccination coverage, it is important to understand the attitudes and vaccination habits of Ukrainian migrants. These findings highlight the need for focused efforts to overcome obstacles like ignorance, vaccine hesitancy, and access problems, while also encouraging adequate information dissemination, addressing issues, and enhancing infrastructure and services for vaccination in order to ensure high vaccination uptake in Ukraine.

Similar findings from another study indicate that many participants, particularly children, had insufficient knowledge. The majority of individuals opposed immunizing boys. Compared to the other groups, parents and community members are less in favour of vaccination. Active community participation in primary preventive methods may increase vaccination uptake through strong awareness, the eradication of anti-vaccine prejudice, and the promotion of the acceptability of HPV vaccination [49]. Another study found safety issue, efficacy of vaccination, knowledge, associated with this vaccination [50]. On the tracking of negative reactions to vaccination in Ukraine, there is no precise information available. However, after vaccinations are authorized for use, the European Medicines Agency and state authorities continuously monitor the vaccine side effects [51]. In the US, the Vaccine Adverse Event Reporting System keeps track of any negative side effects following vaccination [52]. Growing numbers of civilians are finding it increasingly difficult to receive basic services due to rising costs, logistical difficulties, and destroyed infrastructure, according to a WHO evaluation of the country's health needs [53]. The monitoring of unfavourable reactions to vaccination was not mentioned directly in the assessment Ukraine was urged by the WHO to eradicate high-threat viruses kept in the nation's public health laboratories in order to stop "any potential spills" that would spread illness among the populace. The WHO has been working with Ukrainian public health labs to enhance security standards that help prevent unintentional or intentional release for a number of years [54].

In conclusion, the results of the study as well as those of other research shed light on the difficulties and obstructions that stand in the way of a high vaccine uptake in Ukraine. It was shown that one of the most significant barriers is hesitation about vaccination, which is caused by factors such as distrust, a lack of understanding, and access issues. It is necessary to make efforts to overcome these obstacles, including enhancing infrastructure and services for immunization, fostering community engagement, and ensuring that appropriate information is disseminated. In addition, it is essential to address the widespread lack of knowledge and comprehension of pre-vaccination diagnostics among medical professionals and the public community. It is feasible to achieve **high** vaccination coverage and protect the population from illnesses that may be prevented by addressing the concerns that have been raised and encouraging vaccination practices among migrants from Ukraine.

Conclusions and Implications

To ensure the security and effectiveness of vaccination programs, it is essential to understand the peculiarities of conducting the pre-vaccination diagnostics in Ukraine to ascertain the adaptability of the organism. Like many other nations, Ukraine has a distinct healthcare environment, which includes elements like the frequency of particular diseases, population demographics, and healthcare infrastructure. Ukraine can make sure that vaccination programs are successfully implemented improving the public health outcomes and safeguarding the welfare of its population by taking into account the unique aspects of the local context, such as the prevalence of particular diseases or risk factors, and incorporating them into the pre-vaccination diagnostics process.

1. It is possible that pre-vaccination diagnostics are not consistently implemented in Ukraine, with variances in adherence to recommended standards, especially in terms of the kinds of tests that are utilised, the time of testing, and the availability of diagnostic facilities.

2. Obstacles associated with organisational, logistical, and resource management may have an effect on the execution of pre-vaccination diagnostics in Ukraine, which may result in a less-than-optimal level of adherence to the standards that have been developed.

3. The viewpoints of stakeholders, such as healthcare professionals, public health authorities, and laboratory workers, play an essential part in the execution of pre-vaccination diagnostics. Furthermore, the perspectives of stakeholders may have an influence on the efficacy and efficiency of vaccination programs.

4. To maximise the pre-vaccination diagnostics in Ukraine and guarantee consistent adherence to established recommendations, there may be a need for greater stakeholder participation, changes to legislation, and interventions.

Implications:

1. The study's conclusions emphasize the necessity of pre-vaccination diagnostics in Ukraine being standardized and applied consistently. This could entail the creation of national standards for pre-vaccination diagnostics, the implementation of training programs for medical professionals and laboratory staff, and the improvement of diagnostic facilities to guarantee the accessibility and caliber of tests.

2. Policy modifications may be required to address organizational, logistical, and resource-related issues. These policy adjustments may be necessary as a result of the research findings for public health authorities in Ukraine. This could involve allocating sufficient funds, setting up systems to track and assess the application of pre-vaccination diagnostics, and creating plans to increase stakeholder engagement.

3. The results of the study might show where there are gaps or questions that need to be answered. This might involve conducting additional study to investigate the causes of Ukraine's unsatisfactory adherence to pre-vaccination diagnostics, analyze the effectiveness of treatments designed to increase adherence, and evaluate the cost-efficiency of various diagnostic modalities.

4. Since precise pre-vaccination diagnostics are essential to the success of immunization programs, the research findings may have ramifications for public health in Ukraine. Pre-vaccination diagnostic procedures should be consistently followed to help identify people who might not be good candidates for vaccination, potentially minimizing side effects and improving overall vaccination outcomes.

In conclusion, the research findings suggest that there may be peculiarities in the implementation of pre-vaccination diagnostics in Ukraine, with potential challenges related to adherence to established guidelines, stakeholder perspectives, and organizational factors. The implications of these findings include practice and policy changes, as well as the need for further research to address the identified gaps. Improving pre-vaccination diagnostics can have significant implications for public health in Ukraine, optimizing vaccination programs and ultimately improving population health outcomes.

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