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Dentists' Perceptions of Mandatory Vaccination for Hepatitis B, Influenza, Measles, and Rubella: A Study in Georgia

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ABSTRACT

Background and aim: Healthcare workers, including dentists, are at risk of contracting and transmitting infectious diseases despite the availability of vaccines and clear guidelines on preventive measures. In Georgia, hepatitis B, influenza, measles, and rubella are mandatory preventive immunizations for medical personnel employed in dental clinics.

Material and methods: This cross-sectional study aimed to explore the knowledge and attitudes of dentists towards vaccination against these diseases. A questionnaire was administered to a selective group of 165 dentists randomly selected from the 2,435 certified dentists with active status in Georgia.

Results: The study found that while most dentists were aware of the mandatory vaccines, there were knowledge gaps regarding the potential severe complications of these diseases and the effectiveness of vaccination. Most dentists had positive attitudes towards vaccination, but a significant proportion reported concerns about the safety and efficacy of vaccines.

Conclusions: The study highlights the need for continuing education and awareness-raising initiatives among dentists regarding the importance of vaccination against infectious diseases, which could inform future policies and educational programs in dentistry, with the ultimate goal of reducing the transmission of infectious diseases among healthcare workers and patients.

1. Introduction

Hepatitis B, influenza, measles, and rubella are infectious diseases that pose a significant public health threat globally.[1-3] Infectious illnesses, including measles, rubella, hepatitis B, and influenza, are particularly hazardous for dental professionals. The detrimental effects these diseases have on health are substantial. For instance, measles can lead to severe issues like pneumonia, brain inflammation, and a progressive brain disorder known as subacute sclerosing panencephalitis. Rubella, notably dangerous during pregnancy, can result in infants being born with congenital rubella syndrome, characterized by critical developmental defects. Long-term hepatitis B infection can progress to severe liver conditions such as cirrhosis and liver cancer. Often overlooked in its severity, influenza can cause critical respiratory issues and prove fatal, especially in vulnerable populations.[4-8] Dental healthcare workers are at elevated risk of contracting diseases like measles, rubella, hepatitis B, and influenza due to their close contact with patients and exposure to bodily fluids such as saliva and blood. This puts the healthcare workers at risk and increases the chance of transmitting infections to patients. Immunization is a vital preventative measure, offering critical protection to those working in dental environments.[9, 10] However, research indicates inadequate knowledge and unsafe practices among dental students and practitioners, underscoring the need for enhanced education and adherence to infection control protocols.[11, 12] Vaccinations for measles, rubella, influenza, and hepatitis B are vital for dental professionals, though they carry minor risks. The MMR vaccine may cause mild fever and rare allergic reactions.[13] The flu vaccine can lead to arm soreness and occasionally headaches or Guillain-Barré Syndrome.[14, 15] The hepatitis B vaccine might result in temporary soreness or fever, with rare allergic reactions.[16] However, the benefits of these vaccines significantly outweigh these minor side effects.[17-18] After acquiring data from the National Center

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for Disease Control and Public Health of Georgia, the research team presented significant insights on vaccine-related adverse events spanning the last decade. This data, extracted from the center's electronic integrated disease surveillance system and internal database, spanned from 2013 to 2023. In this period, seven recorded adverse events following immunization (AEFI) were associated with the hepatitis B mono vaccine, the MMR vaccine (measles, mumps, and rubella), and the influenza vaccine. Notably, the hepatitis B mono vaccine was linked to no adverse events. In contrast, the MMR vaccine was connected to five cases of adverse events, including one instance involving a 42-year-old medical staff member who developed lymphadenitis. The influenza vaccine was associated with two adverse events, none involving medical personnel. This information emphasizes the vaccines' relative safety, particularly in the context of the medical community, and underscores the vital role of ongoing surveillance for potential adverse effects post-immunization. In 2020, the order of the Minister of Internally Displaced Persons from the Occupied Territories, Health, Labour and Social Affairs of Georgia 01-6/N came into force, which defined the list of activities subject to mandatory preventive immunization, including hepatitis B, influenza, measles, and rubella for dentists and other medical personnel employed in dental clinics in Georgia.[19] The order highlights the importance of vaccination in preventing the spread of infectious diseases among healthcare workers and patients. In 2015 and 2021, population surveys of seroprevalence were conducted twice in Georgia to study the prevalence of hepatitis B and C.[20] Among those tested in 2021, only one case of hepatitis B was confirmed in children (0.03%), indicating the successful progress of the vaccination program.[20] However, the prevalence of hepatitis B and C among adults remains a public health concern in Georgia and globally. According to the World Health Organization (WHO), approximately 71 million people worldwide have chronic hepatitis C infection, and an estimated 257 million people are living with chronic hepatitis B infection.[21-22] Despite the availability of vaccines and clear guidelines on preventive measures, healthcare workers, including dentists, continue to be at risk of contracting and transmitting infectious diseases.[23] Therefore, it is crucial to understand the knowledge and attitudes of dentists towards vaccination against infectious diseases and the measures they take to prevent transmission in dental clinics. This study aims to explore the knowledge and attitudes of dentists towards vaccination against hepatitis B, influenza, measles, and rubella in Georgia.

2. Material and methods

This research aims to investigate the awareness and attitudes of dentists towards mandatory vaccines and diseases that have become mandatory for dental personnel since 2020. Specifically, this includes the hepatitis B, influenza, measles, and rubella vaccines. The following tasks were set: Determine the level of awareness among dentists about these diseases and the vaccines available for prevention; Obtain the number of certified dentists from the State Regulatory Agency for Medical and Pharmaceutical Activities of the Ministry of Internally Displaced Persons from the Occupied Territories, Health, Labour and Social Affairs of Georgia; Develop a questionnaire to survey dentists; Submit the questionnaire to a group of experts for review; Conduct research on a selected group of dentists; Interpret and analyze the results; Review national and international documents related to the above issues. Based on the existing scientific literature, the research hypothesis is that dentists may have insufficient information about the potentially severe complications of hepatitis B, influenza, measles, and rubella, as well as the effectiveness of vaccination. This lack of knowledge may lead to negative attitudes towards mandatory vaccination among dentists. Overall, the study aims to shed light on the attitudes and knowledge of dentists regarding mandatory vaccination, which could inform future policies and educational programs in dentistry. The research was conducted in January-February 2023 in Georgia, including Samegrelo and Imereti in Western Georgia and Kakheti and Tbilisi in Eastern Georgia. A framework was developed to select respondents, and in Tbilisi, the research area of doctors was divided by district. This allowed for a more targeted approach in selecting respondents for the study. The research target group was the 2,435 certified dentists with active status published by the National Statistics Service of Georgia in 2019. Participants were selected based on their professional background in dentistry. Criteria for inclusion in the study were an age range of 25 to 60 years and a minimum of 1 year of clinical practice experience. The questionnaire categorized experience into four brackets: 0-1 years, 1-5 years, 6-10 years, and over 11 years. To create a selective group for the study, we randomly selected 10% of the dentists from the target group, resulting in a sample size of 243 dentists. Out of the 243 selected dentists, we received completed questionnaires from 165 respondents, representing the number of communities interviewed and included in the data analysis. The research tool used in the study is a survey questionnaire that focuses on the mandatory vaccines required for dentists based on the list of activities subject to preventive immunization. The questionnaire is organized into three blocks. The first block collects demographic information about the participating dentists. The second block assesses their awareness of the mandatory vaccines for hepatitis B, influenza, measles, and rubella. The third block examines the dentists' attitudes towards these vaccines, including their perceptions of their benefits, concerns, and compliance with the mandatory vaccination requirements. The study utilized a structured questionnaire consisting of 13 questions. These questions were predominantly close-ended, designed to extract specific information regarding the participants' knowledge, attitudes, and practices concerning hepatitis B, measles, rubella, and influenza, as well as related vaccinations. The questionnaire was distributed in hard copy format to ensure ease of access and response from participants. Ethical considerations were meticulously upheld at all stages of the research to ensure the highest standards of research ethics. Participation in the study was strictly voluntary, with informed consent obtained from each participant before involvement. Detailed information about the study's objectives and procedures was provided to all respondents, ensuring clarity and transparency. To further safeguard participant privacy, the questionnaire was designed to be anonymous, omitting any personal identifiers like names, workplaces, or addresses. In addition to these measures, the ethical aspects of the study received thorough scrutiny and approval from the Expert Council of the Georgian Dental Association. This Council reviewed the questionnaire and the study's methodology, ensuring compliance with established ethical norms and guidelines. Furthermore, all collected data were treated with the utmost confidentiality and used exclusively for this research, maintaining the integrity and privacy of the information provided by the respondents. The research design employed in this study does not have a counterpart in Georgia. It involves using a quantitative research method appropriate for examining attitudes and perceptions among many participants. The data collected from the survey was processed using the computer program SPSS. Statistical measures, such as the arithmetic mean, relative frequencies, and standard deviation, were calculated to analyze the data. The homogeneity criterion ($\chi 2$) was used to determine the statistical reliability of differences between groups, while the difference between means was assessed using the Student's t-distribution. In analyzing the collected data, the study exclusively employed quantitative methods. These methods were chosen to provide clear, measurable, and objective insights into the dentists' knowledge, attitudes, and practices regarding hepatitis B, measles, rubella, and influenza vaccinations.

Quantitative analysis facilitated the examination of trends, patterns, and correlations within the data, offering a comprehensive understanding of the prevailing views and practices among the dental professionals surveyed.

3. Results

The demographic composition of the study's participants was characterized by a gender distribution of 64% female and 36% male, with a diverse range of work experience: 25.9% had 0-1 year of experience, 16.4% had between 1-5 years, 24.1% had 6-10 years, and the largest group, constituting 33.6%, had 11 or more years of work experience. These findings provide insight into the distribution of working experience among the dentists who participated in the study. The study found that the vast majority of research participants believe they have sufficient knowledge about the transmission and prevention of hepatitis B and C. 60% of respondents reported having a relatively high level of knowledge about these viruses. However, 64% of the participants also noted that their academic education (both pre-and post-diploma) provided little coverage of these topics. Additionally, 3% of the participants stated that they had never received academic education on this subject (Fig. 1).

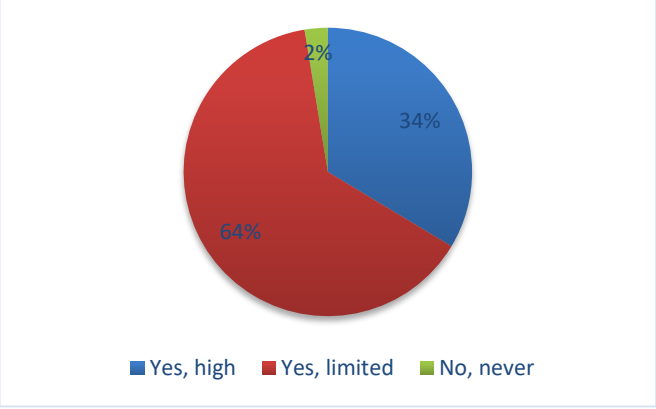

Fig. 1. Did university education include teaching modules on hepatitis B and C?

The study found that only 34.5% of participants reported receiving the hepatitis B vaccine, and only 11% had their antibody titers checked. Among those who reported receiving the vaccine, a majority (57%) were young doctors who had worked for 1 to 5 years. Despite this, 70.7% of respondents stated that they were confident in the effectiveness of the hepatitis B vaccine. However, 26% of the participants were unsure about its effectiveness. The study highlights the importance of assessing the risk of hepatitis B infection. Results show that 67% of the respondents know they have provided services to a patient with hepatitis B or C, while 25% are certain that they have never encountered such a case. Regarding knowledge of post-exposure preventive measures, only 43% of dentists report confidence in their ability to act in case of possible infection. In comparison, 72% state that they lack knowledge in this area. Notably, 74% of participants believe it is critically important to receive additional information about hepatitis B and its prevention through vaccination. In comparison, only 1.7% of respondents feel they do not need further information. The study revealed that the majority of respondents have a positive attitude towards mandatory vaccination for dentists. Specifically, 76% of the participants welcomed the mandatory hepatitis B vaccine regulation in Georgia, while only 6% were strongly against it. 18% of respondents have not yet formed an opinion on the matter. Notably, there is a significant difference in opinion based on the length of a dentist's work experience. As the number of years of work experience increases, the acceptability of mandatory hepatitis B vaccination decreases. (Fig. 2).

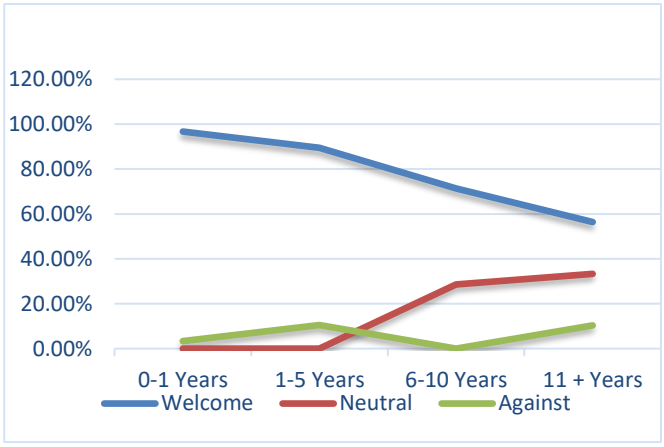

Fig. 2. Dentists' attitude towards the mandatory hepatitis B vaccination by length of work experience.

However, the majority of respondents in the study (60.3%) considered the hepatitis B vaccine to be critically important for dentists, while 35.7% considered it important. According to the study results, dentists considered the measles and rubella vaccines slightly less important than the hepatitis B vaccine and the influenza vaccine much less important. Only 12.3% of respondents considered it critically important for dentists to get the flu shot, while 51.2% considered it important. Furthermore, 24.1% of respondents considered measles and rubella vaccines critically important for medical staff employed in dental facilities, and 51.7% considered them important (Table 1).

The survey asked participants to select the statement that best reflects their attitude towards each vaccine. The responses were categorized into six options: "afraid of side effects," "do not trust," "neutral attitude," "Do not prioritize," "conflicts with beliefs," and "support and use." Overall, most respondents had a neutral attitude towards all three vaccines, with hepatitis B having the highest percentage (37.1%) and flu having the lowest (44.0%). Among those who expressed an opinion, the most common attitude towards all three vaccines was "trust and use," with hepatitis B having the highest percentage (39.7%) and measles/rubella having the lowest (46.6%). A small percentage of respondents expressed fear of side effects for all three vaccines, with the highest percentage being for the flu vaccine (9.5%). A minority of respondents indicated they did not trust the vaccines (ranging from 3.4% for measles/rubella to 5.2% for hepatitis B) or did not consider them a priority (ranging from 1.7% for hepatitis B and measles/rubella to 7.8% for flu). None of the respondents reported a conflict between their religious or cultural values and the vaccines. Finally, a few respondents were unsure of the vaccines' effectiveness, with the highest percentage being for the flu vaccine (1.7%). Overall, these results suggest that most respondents have a neutral or positive attitude towards vaccines and that most of those who expressed an opinion trust and use the vaccines. However, a small minority expressed concerns about side effects or did not consider the vaccines a priority. (Table 2)

Table 1. Importance of different vaccines according to participants.

Vaccine	Extremely Important	Important	Not Important
Hepatitis B	60.3%	35.7%	3.9%
Influenza	12.3%	51.2%	36.6%
Measles/Rubella	24.1%	51.7%	24.1%

Table 2. Attitudes of respondents towards vaccines.

Vaccine	Afraid of Side Effects	Do not Trust	Neutral Attitude	Do not Prioritize	Conflicts with Beliefs	Support and Use	Not Confident in the Effectiveness
Hepatitis B	16.4%	5.2%	37.1%	1.7%	0.0%	39.7%	0.0%
Influenza	9.5%	6.0%	44.0%	7.8%	0.0%	31.0%	1.7%
Measles/Rubella	9.5%	3.4%	38.8%	1.7%	0.0%	46.6%	0.0%

4. Discussion

The findings of this study illuminate several critical aspects regarding the awareness, attitudes, and practices of dentists in Georgia toward mandatory vaccination against hepatitis B, influenza, measles, and rubella. Notably, the demographic representation of participants, with a higher proportion of females (64%), reflects the current trends in the dental profession in many regions, including Georgia. The range of work experience among participants, from novices to veterans, offers a broad perspective on the subject matter. One of the key observations from this study is the varying levels of awareness about the diseases and their respective vaccines among dentists. This varied understanding can significantly influence their attitudes towards mandatory vaccinations. Healthcare workers, including dentists, who are not vaccinated face a significantly increased risk of contracting and transmitting vaccine-preventable diseases within their work environments. This not only jeopardizes their health but also heightens the risk of infecting vulnerable patients, potentially leading to severe health consequences.[24-25] The nature of dental practice further amplifies this risk due to the close contact with patients' oral and respiratory systems, exposure to secretions such as saliva and blood, and the use of aerosol-generating instruments during invasive procedures. These specific conditions in dental settings make the unvaccinated dental staff particularly susceptible to both acquiring and spreading various infectious diseases.[26, 27] The research hypothesis, suggesting insufficient information among dentists about severe complications of these diseases and the effectiveness of vaccines, seems to hold weight. This lack of knowledge may contribute to reluctance or skepticism regarding vaccination, underlining the dental community's need for enhanced educational efforts. Incidents of exposure are common in dental practices, and hepatitis B is widely acknowledged as a professional hazard for dental practitioners.[28] The results also highlight a critical gap in the adherence to infection control protocols, which is concerning given the high-risk environment in which dentists work. This gap can be attributed to inadequate training, lack of resources, or a general underestimation of the risks associated with infectious diseases in dental settings. The study's focus on mandatory vaccines underscores the importance of such measures in protecting healthcare workers and their patients from potential infections. The finding that a substantial number of dentists have concerns about vaccine side effects, despite the low incidence of severe adverse reactions reported in scientific literature, points to the need for enhanced educational initiatives. These initiatives should focus not only on the efficacy of the vaccines but also on addressing misconceptions and fears related to vaccine safety. This is crucial for improving compliance with vaccination requirements and enhancing dental clinics' overall health and safety environment. This study sheds light on the crucial aspects of dentists' knowledge and attitudes toward mandatory vaccination against infectious diseases in Georgia. While there is a general awareness of the importance of these vaccines, gaps in knowledge and varying attitudes highlight the need for targeted educational programs and policy interventions. Enhancing the understanding of the risks and benefits of vaccination among dental professionals is imperative for improving compliance and safeguarding public health.

5. Conclusion

Based on the study results, it can be concluded that although most dentists in Georgia believe they have sufficient knowledge about the transmission and prevention of hepatitis B and C, there are gaps in their understanding. They lack confidence in their ability to act in case of possible infection. Furthermore, there is a need to improve education on these topics, as only a small percentage of participants received academic education on this subject. The study also reveals that while most participants welcomed mandatory vaccination regulations for dentists, the acceptability of mandatory hepatitis B vaccination decreases with increased years of work experience. The hepatitis B vaccine was considered to be critically important by the majority of respondents, followed by the measles and rubella vaccines.

In contrast, the influenza vaccine was considered much less important. Overall, most respondents had a neutral attitude towards all three vaccines,

with the most common attitude towards all three vaccines being "trust and use." A small percentage of respondents expressed fear of side effects for all three vaccines, with the highest percentage being for the flu vaccine. A minority of respondents indicated they did not trust the vaccines or did not consider them a priority. None of the respondents reported a conflict between their religious or cultural values and the vaccines. Finally, a few respondents were unsure of the vaccines' effectiveness, with the highest percentage being for the flu vaccine.

Conflict of Interest

The authors declared that there is no conflict of interest.

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