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Immunization and Vaccines

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Abstract

Immunity is the ability of the human body to resist almost all types of organisms and toxins that can damage tissues and organs. The most important is acquired immunity, which develops after exposure to bacteria, viruses, or toxins. Natural immunity consists of protective barriers that prevent the passage of microorganisms such as skin and stomach acid, phagocytosing cells, and the complement system. Vaccines are biological products that protect against a specific disease by stimulating the immune system. This review aims to address the concepts of immunization and vaccination. One of the most basic components of children and adults' right to a healthy life is the protection of them against diseases by vaccination. Immunization services are among the most important public health interventions for children in terms of preventing vaccine-preventable diseases and deaths.

Keywords: *Immunization, Active immunity, Natural immunity, Vaccination.*

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Introduction

Immunity is the ability of the human body to resist almost all types of organisms and toxins that can damage tissues and organs. The most important is acquired immunity, which develops after exposure to bacteria, viruses, or toxins. Natural immunity consists of protective barriers that prevent the passage of microorganisms such as skin and stomach acid, phagocytosing cells, and the complement system (1). The body has two types of immunization against pathogens: active immunity and passive immunity. Active immunity is achieved by vaccination or recovery from a disease. This type of immunity is usually long-lasting. Passive immunity, however, is achieved by transferring antibodies (immunoglobulins) from other people or animals. This type of immunity is short-lived and lasts from a few weeks to several months, depending on the amount of immunoglobulin administered. Passing antibodies from the mother to the baby through the placenta and giving blood and blood products (such as whole blood, plasma, erythrocyte and platelet suspensions, and immunoglobulin preparations) also provides passive immunity (2). This review aims to address the concepts of immunization and vaccination.

Material and Method

The data in this review were searched through the Web of Science, PubMed, Cochrane Library, Google Scholar, EMBASE (OVID), WHO Global, Council of Higher Education National Thesis Center, and Dergipark databases. The keywords 'Immunization', and 'Vaccine' were used during the search.

Concept of Vaccine

Vaccines are biological products that protect against a specific disease by stimulating the immune system. Vaccines typically contain an agent similar to the disease-causing microorganism. It is made from attenuated or killed forms of the pathogen itself, its toxins, or one of its surface proteins, and this substance stimulates the body's immune system to recognize, destroy, and memorize the agent. Thus, the immune system can more easily recognize and destroy any of these microorganisms that it will encounter later (3). Vaccines can induce humoral immunity through the production of antigen-specific antibodies as well as cellular immunity (4). Vaccines are divided into two main groups:

a) Live attenuated vaccines: This is an attenuated form of a wild virus or bacteria. The agent reproduces in the body, but since it is attenuated, it produces immunity without causing disease. They usually produce immunity in a single dose. Live vaccines are sensitive to heat and light. This group of vaccines should never be administered to immunocompromised individuals and

pregnant women. Tuberculosis, measles, rubella, mumps, chicken pox, and oral polio vaccines are examples of live vaccines.

b) Inactivated vaccines: These vaccines are produced from the whole, parts, or toxins of the agent. The desired level of immunity is achieved by administering more than one dose. Since antibody levels decrease over time, a booster dose is required. Diphtheria, tetanus, hepatitis B, and pneumococcal vaccines are examples of inactivated vaccines (5).

History of Immunization

The word "vaccine" is derived from "Vaccinia virus", a type of Poxvirus that was used to protect against smallpox (6). Benjamin Jesty observed that dairy women who contracted cowpox were protected from smallpox, and during an outbreak in 1774, he took material from a lesion on a cow's udder and vaccinated his wife and two sons (7). In 1796, based on this observation, Edward Jenner initiated the first systematic immunization. Jenner took a substance from the pustules of a person who had been exposed to smallpox and administered this substance under the skin on the arms or legs of a non-immune person, this method was called the vaccination method and protected against smallpox in a non-immune person (8).

This practice was applied in different parts of the world for centuries (9). In 1771, the wife of the British Ambassador wrote a letter to her friend in England, describing her observations in detail on the application of the variolation method in Istanbul to protect against smallpox. This document is the oldest known document on vaccination (10).

The people who applied this method did not know that the disease was caused by agents such as bacteria or viruses, and applied this method based entirely on observations. Following Jenner, Louis Pasteur (1822-1895) and Robert Koch (1843-1910) proved that there were some pathogenic microorganisms causing diseases (8). In 1885, Louis Pasteur proved that infectious diseases could be prevented by administering the rabies vaccine for the first time (9). In the second half of the nineteenth century, microorganisms causing diseases started to be identified.

History of vaccination and expanded program on immunization in Turkey

The first vaccination in Turkey started in 1930 with the smallpox vaccination. Afterwards, the following vaccines were added to the current vaccination schedule: 1937: Diphtheria, Pertussis, 1952: BCG, 1963: Live polio, 1968: DPT, 1970: Measles, 1989: Polio Eradication Program, 1995: Polio National Vaccination Days, 1996: Measles Vaccine Acceleration Campaign, 1997: Polio Mop-up, 1998: Hepatitis-B Vaccination and the last polio case, 2003: Measles School Vaccination Days, 2004: Transition to Td vaccine in all cases where tetanus vaccine is required for adults, 2005: Measles Vaccination Days, 2006: Addition of the Rubella, Mumps, and Hib vaccines to the program, introduction of Hepatitis B adolescent vaccination, 2007-2008:

Completion of Hepatitis B and Rubella vaccination of primary school age groups, 2008: Introduction of the five-component (DaBT-P/Hib) vaccine, November 2008: Introduction of the seven-component Conjugated pneumococcal vaccine into the program, February 2009: Elimination of maternal and neonatal tetanus, 2010: Introduction of DaBT-IPA vaccine in 1st grade primary education instead of Td and live polio vaccine, 2011 April: Introduction of 13-component conjugated pneumococcal vaccine, 2012 November: Hepatitis A vaccine and Varicella vaccine in February 2013 (11). The Expanded Program on Immunization Circular (EPI) states that each family physician and family healthcare professional should form a team to regularly follow the registered individuals on immunization within the relevant legislation. Family Physicians and Family Healthcare Professionals are responsible to the Community Health Center (CHC) for carrying out vaccination activities following the targets set in the EPI (12).

Immunization services in family medicine, relevant legislation and legal situation Turkey

Article 7 of the Family Medicine Implementation Regulation states that family physicians should coordinate vaccination procedures by regularly monitoring the population under their care, taking necessary precautions regarding the storage of vaccines and cold chain, and working together with Community Health Centers to achieve national vaccination targets (13). In the Expanded Program on Immunization Circular, it was also stated that each family physician and family healthcare professional should form a team to regularly follow their registered individuals on immunization within the framework of the relevant legislation. Family Physicians and Family Healthcare Professionals are responsible to the CHC for carrying out vaccination activities following the targets set in the EPI (14). In Turkey, parents who did not want their children to receive any vaccine within the scope of the expanded vaccination schedule were reported to the Provincial Directorates of the Ministry of Family and Social Policies according to the Child Protection Law No. 5395, and health measures were taken for these children (15). However, with the individual application to the Constitutional Court for the decision taken on compulsory vaccination and the decision dated 11.11.2015, the Constitutional Court ruled that compulsory vaccination violated the right to protect and improve the corporeal and spiritual existence of the individual guaranteed in Article 17 of the Constitution (16). Following this decision, in the regulation dated 19.01.2016 published by the Department of Vaccine-Preventable Diseases of the Public Health Institution of Turkey, it was deemed sufficient to fill out a form stating that vaccination is not allowed in case of refusal of compulsory vaccination (17). With this decision, vaccine refusal continues to increase in Turkey.

Conclusion

As a result; One of the most basic components of children and adults' right to a healthy life is the protection of them against diseases by vaccination. Immunization services are among the most important public health interventions for children in terms of preventing vaccine-preventable diseases and deaths. The current national vaccination program implemented in our country is a program that is successfully implemented in many ways and in which vaccines are used against many infectious agents.

Conflict of Interest

There is no conflict of interest between the authors.

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