IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Vaccination and India:

Varsha Dabhade and P. V. Pawar

Madhavrao Patil ACS College Palam Dist.Parbhani Maharashtra

Abstract:

The challenges faced in delivering lifesaving vaccines to the targeted beneficiaries need to be addressed from the existing knowledge and learning from the past. This review documents the history of vaccines how comes first time in India and ingredients and development of vaccine.

Keywords: Vaccine, ingredients, development, history and India

Vaccination is a simple, safe, and effective way of protecting people against harmful diseases, before they come into contact with them. It uses your body's natural defences to build resistance to specific infections and makes your immune system stronger. Most vaccines are given by an injection, but some are given orally (by mouth) or sprayed into the nose (WHO). The importance of vaccination is a safe and effective way to prevent disease and save lives; now more than ever. When we get vaccinated, we aren't just protecting ourselves, but also those around us. Some people, like those who are seriously ill, are advised not to get certain vaccines, so they depend on the rest of us to get vaccinated and help reduce the spread of disease.

Today there are vaccines available to protect against at least 20 diseases, such as diphtheria, tetanus, pertussis, influenza and measles. Together, these vaccines save the lives of up to 3 million people every year. In the early 1900s, polio was a worldwide disease, paralysing hundreds of thousands of people every year. By 1950, two effective vaccines against the disease had been developed. But vaccination in some parts of the world was still not common enough to stop the spread of polio, particularly in Africa. In the 1980s, a united worldwide effort to eradicate polio from the planet began. Over many years and several decades, polio vaccination, using routine immunization visits and mass vaccination campaigns, has taken place in all continents. Millions of people, mostly children, have been vaccinated and in August 2020, the African continent was certified wild poliovirus free, joining all other parts of the world except Pakistan and Afghanistan, where polio has not yet been eradicated.

History: How the world's first vaccine came to India:

Over the following 150 years, hundreds of millions Indians were vaccinated and there was some success in containing the ravage of disease. However, with growing and more mobile population, logistical problems and vaccinations failures, mistrust of western medicine and sheer apathy, smallpox remained major public health issue at he time of independence. Even as late as 1963, there were over 25000 smallpox deaths in India. Only a determined vaccination campaign backed by World Health Organisation, involving the mass mobilisation of health workers and citizens in surveillance and containment measures, secured its local eradication 1975 (Bennet, war of smallpox)

Older people will remain horror of small box. It was a deadly virus, with a case fertility rate of more than one in for, for higher than Covid-19. The vaccine for smallpox, the one first vaccine, comes to India in 1802. British Indians had been living with the disease for centuries. In larger cities, smallpox was ever present. In rural area, especially in South India, it appeared in epidemic from every few years. In 1798, *Edward Jenner,* an English physician published his thesis that inoculation of gold box, pustular disease is found on the udder of cows, provided full and safe protection from small box clinical trial in London in 1799 conform to his experiment and over the following years, cow box or vaccine inoculation, as it was first term, begin to win acceptance in England and attracted interest overseas, including the colonial India. Jenner regarded his discovery as a global good and so to make the vaccine freely available worldwide. The problem was that cow box was the real scene in England. From the outset, vaccine supply dependent on the practice of vaccination. The vehicle rising on the arm of vaccinated child was lanced to provide lymph for other children. Practitioner has also tried lymph on cotton threads for their future use and for dispatch to colleagues to see the practice elsewhere. From 1800 onwards, Jenner and other sent vaccine sample by sea to India, but the vaccine had a short life shell, especially in hot and humid climate. Early in 1802, improvement in packaging made it possible to send a viable vaccine from Vienna to Baghdad where a British surgeon propagated fresh vaccine on local children for transmission to Bombay.

The first vaccination in India took place in June 1800. The patient was *Anna Dustahall,* a three year old, mixed race girl in then Bombay. From the vets vehicle on her arm all the children were vaccinated, establishing the practice locally and making sample available for dispatch inland to Poona, and from there town to town, down the Malabar coast, up to Madras and thereby sea to Calcutta. The live of vaccine was maintained by vaccinated children in one place and then escorting them to another district to go arm to arm the children there. All the vaccination in India about 20 year where from stock derived from the girl in Bombay. The largest gear vaccination to place in the British area of control. In the presidency of Madras, Indian practitioners were paid for numbers vaccinated, and hundreds of thousands of peoples were vaccinated in few years. *Swammy Naik,* an army surgeon, clocked up 900,000 vaccinations during his career, probably a world record.

There were inevitable the challenges in establishing the practice across India. Texts on vaccinations were translated into Sanskrit, Hindi, Tammil and other languages. There was some hope initiate the Hindu would well come the association with the cow. While many Brahmins endorsing the new practices, there was naturally Great deal of hesitancy inoculating animal disease, passing it from body to body across religious and caste lines. To maintain supply

vaccine it was often necessary entice poor parent to bring for one of their children with doles of rice and trinkets. In the first decade of the practice, there were over a million vaccination activity, spreading the practice around the Indian Ocean and south east Asia region, and conducting the new experiments in delivery.

In avid to dispel some of the misgivings, Indian rules, many of whom had western doctors in their service, led the way in having their families vaccinated. After British occupation of Delhi in 1805, *Shah Alam,* the Mughal Emperor, had his grandchildren vaccinated, *Raja Serfoji* of *Tanjore* (Thanjavur), passionate about science took up vaccination himself. At the royal court of Mysore, vaccination was already well guarded in 1805, when the raja took second wife who was still susceptible smallpox. It was decided that she should be vaccinated before the marriage, an event that, according to historian *Nigel* Chancellor, was commemorated by Irish born painter *Thomas Hickey* in a group portrait, in which the young queen is depicted pointing to the site of vaccination.

"Three Princess of Mysore": The portrait painted by Irish born painter, *Thomas Hickey*, and it makes an extremely crucial point in the way people perceived medical treatment and vaccination. *Maharaja Mummadi Krishnaraj Wodiyar* III ruler of Mysore Dinesty, at left his senior most queen *Maharani Pattamahisi* and at right Maharani Devajamanni, *Lakshimivilasa Sanidhana,* the younger queen, typically covered her left arm, but it was left exposed so she could point to where she had been vaccinated 'with minimum loss of dignity' (Source: Wikipedia)

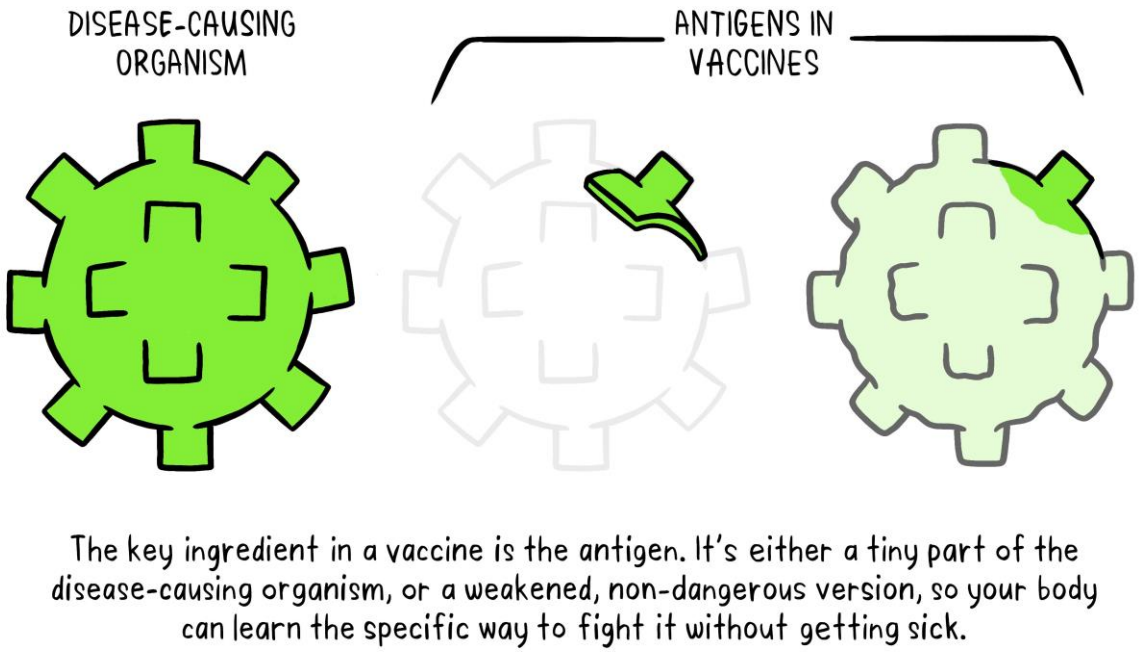
Ingredients of vaccine:

The ingredients in a vaccine are tiny fragments of the disease-causing organism or the blueprints for making the tiny fragments. They also contain other ingredients to keep the vaccine safe and effective. These latter ingredients are included in most vaccines and have been used for decades in billions of doses of vaccine. Each vaccine component serves a specific purpose, and each ingredient is tested in the manufacturing process. During the COVID-19 pandemic, vaccination continues to be critically important. The pandemic has caused a decline in the number of children receiving routine immunizations, which could lead to an increase in illness and death from preventable diseases. The vaccine works on to reduce risks of getting a disease by working with your body's natural defenses to build protection. When you get a vaccine, your immune system responds. It: 1. Recognizes the invading germ, such as the virus or bacteria. 2. Produces antibodies. Antibodies are proteins produced naturally by the immune system to fight disease. 3. Remembers the disease and how to fight it. If you are then exposed to the germ in the future, your immune system can quickly destroy it before you become unwell.

The vaccine is therefore a safe and clever way to produce an immune response in the body, without causing illness. Our immune systems are designed to remember. Once exposed to one or more doses of a vaccine, we typically remain protected against a disease for years, decades or even a lifetime. This is what makes vaccines so effective. Rather than treating a disease after it occurs, vaccines prevent us in the first instance from getting sick.

Vaccine ingredients can look unfamiliar when they are listed on a label. However, many of the components used in vaccines occur naturally in the body, in the environment, and in the foods we eat. All of the ingredients in vaccines – as well as the vaccines themselves - are thoroughly tested and monitored to ensure they are safe. Vaccines train your immune system to create antibodies, just as it does when it's exposed to a disease. However, because vaccines contain only killed or weakened forms of germs like viruses or bacteria, they do not cause the disease or put you at risk of its complications. All ingredients are tested for safety and briefly discussed below.

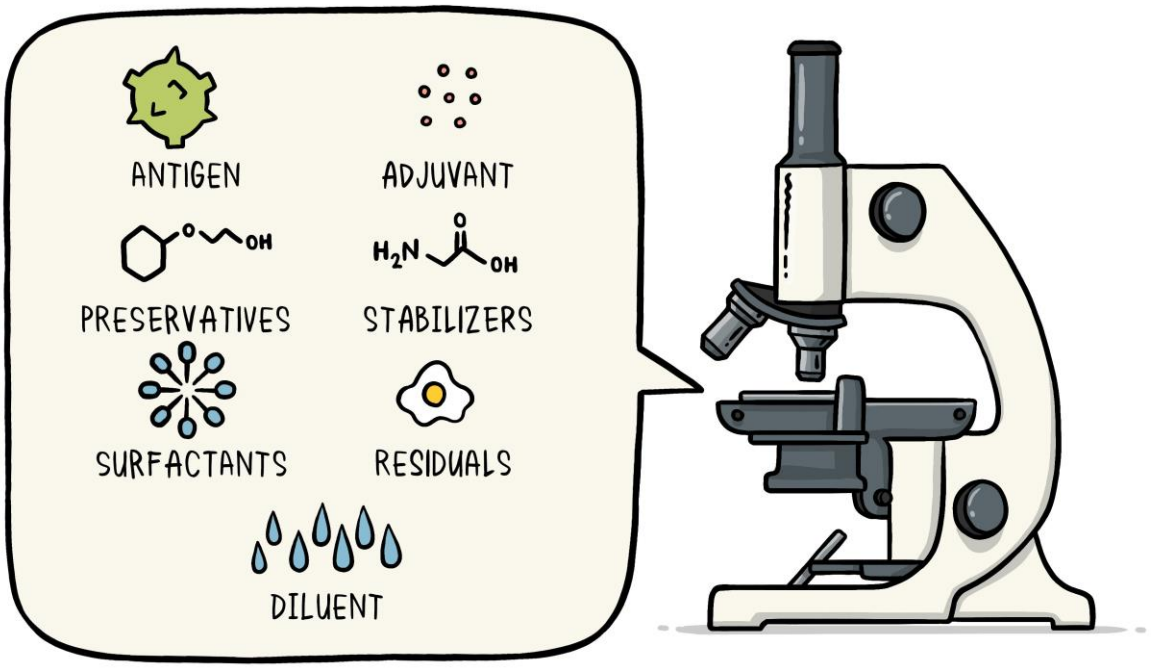
Antigen: All vaccines contain an active component (the antigen) which generates an immune response, or the blueprint for making the active component. The antigen may be a small part of the disease-causing organism, like a protein or sugar, or it may be the whole organism in a weakened or inactive form.



Source: WHO

Preservatives: Preservatives prevent the vaccine from becoming contaminated once the vial has been opened, if it will be used for vaccinating more than one person. Some vaccines don't have preservatives because they are stored in one-dose vials and are discarded after the single dose is administered. The most commonly used preservative is 2-phenoxyethanol. It has been used for many years in a number of vaccines, is used in a range of baby care products and is safe for use in vaccines, as it has little toxicity in humans.

Stabilizers: Stabilizers prevent chemical reactions from occurring within the vaccine and keep the vaccine components from sticking to the vaccine vial. Stabilizers can be sugars (lactose, sucrose), amino acids (glycine), gelatin, and proteins (recombinant human albumin, derived from yeast).



Source: WHO

Surfactants: Surfactants keep all the ingredients in the vaccine blended together. They prevent settling and clumping of elements that are in the liquid form of the vaccine. They are also often used in foods like ice cream.

Residuals: Residuals are tiny amounts of various substances used during manufacturing or production of vaccines that are not active ingredients in the completed vaccine. Substances will vary depending on the manufacturing process used and may include egg proteins, yeast or antibiotics. Residual traces of these substances which may be present in a vaccine are in such small quantities that they need to be measured as parts per million or parts per billion.

Diluent: A diluent is a liquid used to dilute a vaccine to the correct concentration immediately prior to use. The most commonly used diluent is sterile water.

Adjuvant: Some vaccines also contain adjuvants. An adjuvant improves the immune response to the vaccine, sometimes by keeping the vaccine at the injection site for a little longer or by stimulating local immune cells.

The adjuvant may be a tiny amount of aluminium salts (like aluminium phosphate, aluminium hydroxide or potassium aluminium sulphate). Aluminium has been shown not to cause any long-term health problems, and humans ingest aluminium regularly through eating and drinking.

How are vaccines developed?

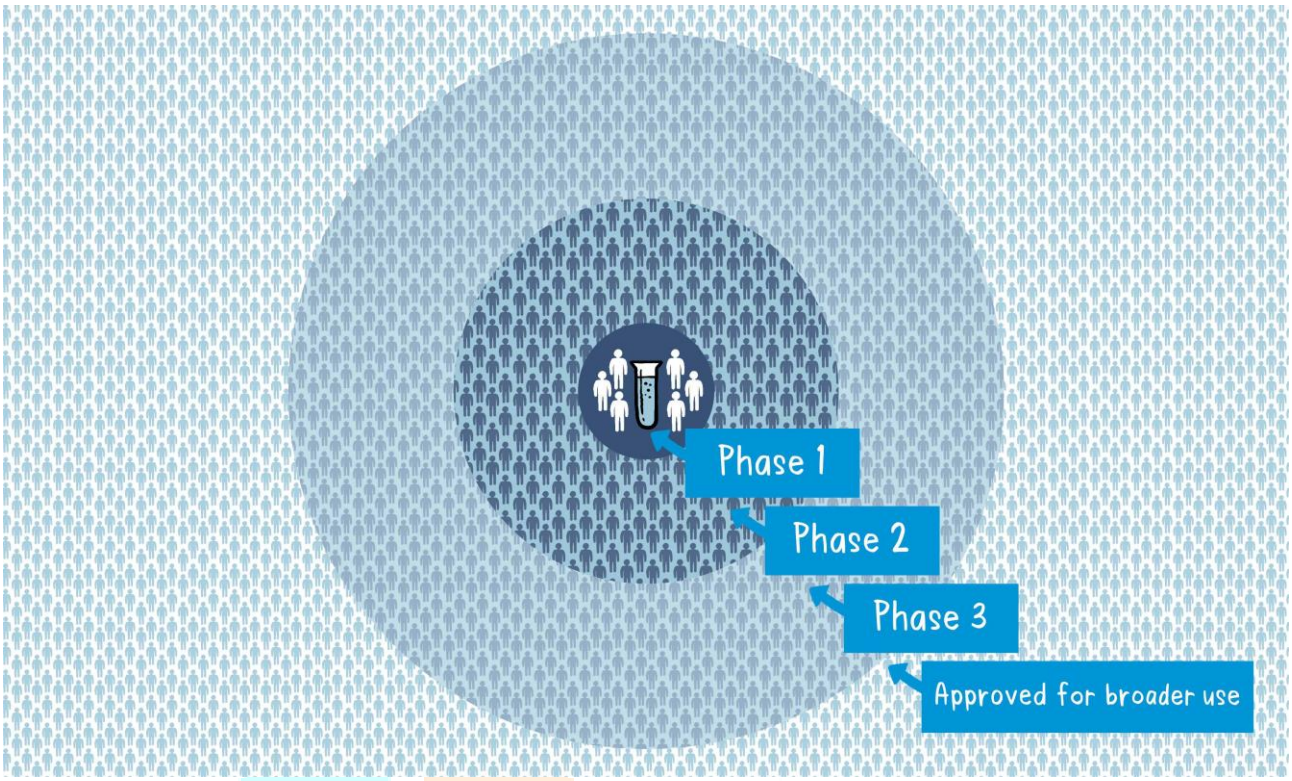
Most vaccines have been in use for decades, with millions of people receiving them safely every year. As with all medicines, every vaccine must go through extensive and rigorous testing to ensure it is safe before it can be introduced in a country's vaccine programme. Each vaccine under development must first undergo screenings and evaluations to determine which antigen should be used to invoke an immune response. This preclinical phase is done without testing on humans. An experimental vaccine is first tested in animals to evaluate its safety and potential to prevent disease. If the vaccine triggers an immune response, it is then tested in human clinical trials in three phases.

Phase 1: The vaccine is given to a small number of volunteers to assess its safety, confirm it generates an immune response, and determine the right dosage. Generally in this phase vaccines are tested in young, healthy adult volunteers.

Phase 2: The vaccine is then given to several hundred volunteers to further assess its safety and ability to generate an immune response. Participants in this phase have the same characteristics (such as age, sex) as the people for whom the vaccine is intended. There are usually multiple trials in this phase to evaluate various age groups and different formulations of the vaccine. A group that did not get the vaccine is usually included in phase as a comparator group to determine whether the changes in the vaccinated group are attributed to the vaccine, or have happened by chance.

Phase 3: The vaccine is next given to thousands of volunteers – and compared to a similar group of people who didn't get the vaccine, but received a comparator product; to determine if the vaccine is effective against the disease it is designed to protect against and to study its safety in a much larger group of people. Most of the time phase three trials are conducted across multiple countries and multiple sites within a country to assure the findings of the vaccine performance apply to many different populations.

During phase two and phase three trials, the volunteers and the scientists conducting the study are shielded from knowing which volunteers had received the vaccine being tested or the comparator product. This is called "blinding" and is necessary to assure that neither the volunteers nor the scientists are influenced in their assessment of safety or effectiveness by knowing who got which product. After the trial is over and all the results are finalized, the volunteers and the trial scientists are informed who received the vaccine and who received the comparator.



Source: WHO

When the results of all these clinical trials are available, a series of steps is required, including reviews of efficacy and safety for regulatory and public health policy approvals. Officials in each country closely review the study data and decide whether to authorize the vaccine for use. A vaccine must be proven to be safe and effective across a broad population before it will be approved and introduced into a national immunization programme. The bar for vaccine safety and efficacy is extremely high, recognizing that vaccines are given to people who are otherwise healthy and specifically free from the illness.

Further monitoring takes place in an ongoing way after the vaccine is introduced. There are systems to monitor the safety and effectiveness of all vaccines. This enables scientists to keep track of vaccine impact and safety even as they are used in a large number of people, over a long time frame. These data are used to adjust the policies for vaccine use to optimize their impact, and they also allow the vaccine to be safely tracked throughout its use.

When someone is vaccinated, they are very likely to be protected against the targeted disease. But not everyone can be vaccinated. People with underlying health conditions that weaken their immune systems (such as cancer or HIV) or who have severe allergies to some vaccine components may not be able to get vaccinated with certain vaccines. These people can still be protected if they live in and amongst others who are vaccinated. When a lot of people in a community are vaccinated the pathogen has a hard time circulating because most of the people it encounters are immune. So the more that others are vaccinated, the less likely people who are unable to be protected by vaccines are at risk of even being exposed to the harmful pathogens. This is called herd immunity. This is especially important for those people who not only can't be vaccinated but may be more susceptible to the diseases we vaccinate against. No single vaccine provides 100% protection, and herd immunity does not provide full protection to those who cannot safely be vaccinated. But with herd immunity, these people will have substantial protection, thanks to those around them being vaccinated. Vaccinating not only

protects yourself, but also protects those in the community who are unable to be vaccinated. If you are able to, get vaccinated.

References:

https://www.who.int/news-room/q-a-detail/vaccines-and-immunization-what-is-vaccination

Michel Bennett: War Against Smallpox: Edward Jenner and the Global Spread of Vaccination

https://en.wikipedia.org/wiki/Vaccination