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Role of Pharmacist in Immunisation – A Review



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ABSTRACT

Vaccination is one of the most cost effective, successful medical interventions that prevent more than twenty life-threatening diseases globally. According to the estimate of National Immunisation Coverage of WHO/UNICEF in 2018, more than 116 million or 86% of all infants were vaccinated throughout the consequent years ^[1]. India is one of the first countries to adopt the World Health Organization's Expanded Program of Immunisation (EPI). The programme was started in 1978 in India and had considerable changes in the following years ^[3]. Even though India is a leading producer and exporter of vaccines, the country is still in the list of 10 countries which are under vaccinated.^[4,2] There are a handful of reasons for the failure of routine immunisation and thus vaccination is one of the concerns in health ministry. One of the certain reasons for the failure is lack of coverage of individual vaccines to prevent the diseases. Pharmacists who are qualified health care professionals play a vital role in administering vaccines and educating on immunisation programmes ^[4]. This article reviews about the role of pharmacist in immunisation programmes along with potential challenges they are facing currently and applicable solutions in India.



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INTRODUCTION

Immunisation is the process by which a person acquires immunity to specific infections by the administration of vaccines.^[5] Vaccination is the most successful public health achievement in the 20th century since it save millions of life at all ages globally. It is crucial in preventing and controlling infectious disease outbreaks. Currently available vaccines prevent more than 20 fatal diseases like diphtheria, tetanus, pertussis, influenza and measles. Approximately 2.5million children under age of five years die every year due to infectious diseases that can be prevented by routine immunisation.^[6] Thus, Vaccine-preventable diseases (VPD) are found to be one of the key reasons for the death of children before the age of five. More than 2.6 million children are unvaccinated in India leaving them at a high risk for infectious diseases.^[2]

The pharmacy professionals are one among the most accessible health care practitioners who work efficiently in public health care settings.^[7,8] They have a significant role in promoting and educating on the uptake of vaccines. Over the past decades, their activities are compatible with the preventive aspects of pharmaceutical care. Additionally, there are pharmacy-based vaccinations which develop skilled pharmacists who act as educators/advisors to facilitate global or national routine vaccination strategies in many developed countries ^[7]. Nevertheless, pharmacists in India work by storing and transporting vaccines rather than administering them.^[9] In developing countries like India, pharmacists may develop competency in administering vaccines with their skills and knowledge. The legal authorities can take up the responsibility to bring pharmacists as non traditional vaccinators with relevant professional requirements. Thereby, they can make a link between health care professionals and patients and can report the adverse events after vaccination.^[9]

IMMUNISATION AT ALL AGES

Everyone is concerned about immunisation at childhood and not many are aware about adult immunisation. Parents are less concerned about their children at adolescent age till they get affected by major communicable diseases. The World Health Organisation (WHO) is looking forward for the prevention of serious communicable diseases at all ages.^[10] The WHO and United Nations Emergency Fund (UNICEF) consider 10-19 year old as adolescents who require more attention as they are vulnerable to communicable diseases such as Human Papilloma Virus(HPV), Human Immunodeficiency Virus (HIV) and Hepatitis infections. In India, people are facing complications of HPV spread with oncogenic HPV, such as cervical,

oral, vaginal, pineal, and oropharyngeal cancers. HPV is a common sexually transmitted disease and the prophylactic HPV vaccine has been effective in disease prevention and reducing its risk in both young women and men.^[11] Acquired Immunodeficiency Syndrome (AIDS) caused by HIV which is having high mutagenic character has built a barrier in developing HIV vaccine. Even though the vaccine is in experimental stage, the success of phase-1 trial gives us hope for the future release to the market. The status of hepatitis vaccine is quite different with HBV and HEV as they are available globally and HCV is still under experimentation. Lack of proper experimental animal models hold the testing efficacy of vaccines.^[10] Childhood vaccination is more reviewed considering the burden of vaccine preventable diseases at their ages. In developing countries like India, children younger than age five are vulnerable to pneumonia, polio, measles and rotavirus infections. The government has extended immunisation programmes to-diphtheria, pertussis, tetanus, polio, tuberculosis and measles to have better coverage. The burden of these diseases generate global concern to eradicate them by efficient vaccination schedules at early ages, documenting them properly and completing the courses at adulthood.^[12] Even during pandemics like COVID, researchers are keen to develop vaccines. This growth in vaccine development explicitly delivers the need for immunisation for everyone and everywhere.

NATIONAL IMMUNISATION IN INDIA

Where are we now?

The vaccination programmes in India had a 30 year old history of pandemics and epidemics that affected the country adversely. However, the efforts of Government officials led to the launch of National Immunisation Programme in India or Expanded Immunisation Programme on Immunisation (EIP) in 1978 and then Universal Immunisation Programme (UIP) in 1985 which expanded the network beyond urban areas.^[14] The major milestones in the history of vaccines were the eradication of smallpox in 1977, followed by polio elimination in 2014 and maternal and neonatal tetanus elimination in 2015.^[13,14] In the year of 2005, National Rural Health Mission was added to UIP. Twelve vaccine preventable diseases were selected from national and sub-national groups and under UIP the government provided free of cost vaccines to the population. Nationally they provided nine vaccines against Diphtheria, Pertussis, Tetanus, Polio, Measles, Rubella, severe form of Childhood Tuberculosis, Hepatitis B and Meningitis & Pneumonia caused by Hemophilus Influenza type B and sub-nationally three vaccines against Rotavirus diarrhoea, Pneumococcal Pneumonia and Japanese

Encephalitis.^[14] While India is keen on launching different immunisation programmes, the coverage of vaccines to rural population are still hindered due to several reasons. The report of the Ministry of Health and Family Welfare (MoHFW) in January 2019 disclosed that the immunisation coverage is at 1% increase per year following 2016. Adding to it, two in five infants did not receive complete immunisation especially the poor leaving them susceptible to infectious diseases. On the other hand, immunisation reduced infant deaths to 1.2 million (2015) from 3.3 million (1990). Another initiative of Indian Government is the practice of Mission Indradhanush which launched in December 2014 aimed to ensure 90 percent vaccination to children by 2020. The past five year report says that the growth rose to 6 percent over these years.^[13] The inter-state variation in the coverage of vaccines is as follows; Goa, Punjab, Sikkim, Kerala are the four states having >80% complete immunisation, while other 5 states like Bihar, Madhya Pradesh, UP, Nagaland and Arunachal Pradesh showed <50% and highly populated states contributed 80% of unimmunised children in India (Coverage Evaluation Survey 2009).^[4] The diversities in culture, geography and certain misconceptions along with political instabilities and operational challenges make India ranked among the list of countries with unprotected children.

ROLES OF PHARMACIST

American Society of Health-system Pharmacists (ASHP) states that pharmacists can conceive a major role in disease prevention by advocating and administering immunisations ^{[7].} Many countries grant pharmacists with role of immunizers and as first point of contact for health care needs. Therefore, they have a significant role in the uptake of vaccines. Pharmacists can effectively store, transport, administer and report adverse effects of vaccines thereby, reduce the workload of physicians. Pharmacy-based vaccination centres improve the knowledge for vaccination in public by advocating, administering the vaccines. India, inspite of being a leading producer and exporter of vaccines is home to one third of worlds unimmunized children. ^[15] The multifactorial barriers include lack of education about vaccines and vaccine-preventable diseases, financial concerns, attitudes of patients and providers towards vaccinations and geographic diversity along with inadequate monitoring and supervision.^[16] Thus promoting the pharmacists as immunizers who are educated in the practice of immunisation delivery can provide a convenient approach in enhancing vaccination rates. The following can be crucial roles played by pharmacists in advancing public health:

PHARMACISTS AS PROVIDERS

Community pharmacies can be portrayed as non traditional settings for immunisation purposes. Surveys conducted in United States report that patients often prefer receiving vaccinations from nontraditional settings than hospitals or physicians due to convenience. Other contributing factors include service during off hours and reduced cost of vaccine administration. Multiple locations of community pharmacies also provide populations an increment in the number of healthcare settings for access to vaccine services.^[17]

Vaccines being biological products approved by US Food and Drug Administration are classified as pharmaceutical products and thus come under one of the unique expertise of pharmacists. Pharmacists play a key and essential role at the two ends of the inventory network: first, in choosing medications that should be accessible to assist a populace and, furthermore at the purpose of administering where drug specialists can exhort the patient on the ideal utilization of medication. The skill of pharmacists as medicines experts is required as a feature of a group way to deal with supply chain management. Pharmacy based immunisation programs allow pharmacists to play an integral role in vaccine education, mobilization, distribution, access, record keeping, administration and ultimately, improving vaccination rates. These recommendations call for all providers, including pharmacists, to implement policies and processes that increase adult vaccination.

PHARMACISTS AS EDUCATORS

Trained pharmacists are perfect volunteers to engage in conversations with patients to dispel myths regarding vaccines, alleviate doubts and provide vaccine reminders and recommendations. They can also educate communities through awareness programs and cue card distributions on the need for vaccination during patient pharmacy visits. As providers of medications, patient visits enable pharmacists for open discussions and thus enhancing vaccination adherence along with adequate patient follow-up.^[22]

Using a combination of screening pharmacy records, distributing vaccine literature, and urging vaccination, community pharmacists in the Isle of Wight, England, vaccinated 9.7% of all patients who received influenza vaccine on the island during the 2010–2011 influenza season. They also noted that it was a pharmacy staff reminder that led to the initiation of two-thirds of these vaccinations.^[21]

PHARMACISTS AS IMMUNIZERS

In 1996, pharmacists began providing immunisations directly to adults. Synchronously several states have adopted policies to include pharmacists as immunizers. The increased pharmacist participation led to improved vaccination rates in elderly and high risk populations which was appreciated by traditional immunizers.^[18]

It was estimated that 55% of people over 18 years were visiting pharmacies in a given week providing ample opportunities for pharmacist-patient interactions.^[19] Being active immunizers, pharmacists can cross check for interactions and contraindications, thus enabling them to administer vaccines effectively. This will also ensure direct action without people being referred elsewhere leading to forgetful tendencies.^[17]

A 2016 systematic review on pharmacists as immunizers found an increase in vaccination rates and/or vaccine coverage when pharmacists were involved in the immunisation process, regardless of their role. Studies in Canada examining pharmacists as immunizers have focused on influenza vaccination and demonstrated increased influenza vaccination uptake with pharmacist involvement.^[20] This practice also benefits in case of mass vaccinations (during a pandemic) where large proportion of community vaccinations must be met.^[17]

CHALLENGES

Despite the global availability of vaccines for extremely wide range of infectious diseases, immunisation and related programs are not employed completely. The major challenges are posed by social, economical, biological, logistic and epidemiological factors. ^[23] These multifactorial aspects may take a toll on the achievability of national and international vaccination goals to eradicate vaccine preventable diseases. In India there is a critical need to start a scholarly exercise pointed toward achieving patching up of educational plan, keeping in speed with current and arising patterns in the field of pharmacy. Lamentably every one of these years, enough accentuation was not laid on reinforcing the parts of Community Pharmacy, Hospital and Clinical Pharmacy, while planning educational program at certificate and degree levels of teaching. They must be properly analyzed and befitting strategies must be adopted to overcome these challenges.

FAMILY BARRIERS

‘Vaccine hesitant’ parents are growing concerns promoting recurrence of vaccine preventable diseases in young population. Lack of knowledge and little awareness on vaccine effectiveness has reduced vaccine priorities in populations. Surveys conducted in various countries have reported psychological, religious and social aspects worsening the current situation.^[24]

- The constituents of vaccines including fetal tissues and animal derived gelatin has led to religious concerns and thus rendering vaccines non acceptable to many groups.^[25]
- Certain other people believe that lifestyle modifications and healthy diet can boost immune system naturally rather than administering artificial antigens.^[26]
- Responses from various platforms including social media, television, family and friends too have made it difficult for parents to frame decision about vaccinating their children. Antivaccine movements based on conspiracy theories and misconceptions have promoted these anomalies to a greater extent.
- A cross sectional study conducted in the state of Maharashtra reported that mother’s education, socioeconomic status of the family, lack of mother’s knowledge about immunisation and ignorance and fear of losing daily wages were important factors responsible for un-immunisation or partial immunisation.^[27]

PROVIDER BARRIERS

Outdated and incomplete knowledge on indications, adverse effects and contraindications of vaccines are still extending dilemma in the healthcare field. This can hamper effective communication between healthcare provider and patient creating a negative impact on immunisation programs.

- Logical barriers including vaccine cost, storage requirements and lack of vaccination records also contribute to incomplete immunisation procedures. For example, MMR and rotavirus vaccine have demanding storage criteria that may not be met by certain pharmacies.
- Ineffective clinical hours with physicians who do not address basic concerns about vaccination can also demotivate people from accepting the importance of vaccination. This may lead to missed clinical visits and incomplete vaccination schedules.^[23]

- Various streams of medicine including homeopathy and ayurveda may not promote the importance of vaccines to greater extent. Thus evidence based awareness on vaccines must be promoted to bring down this ignorance.^[28]

SYSTEM BARRIERS

System barriers generally involve inadequacies present in health system practices that affect immunisation rates in all the groups.

- Reminder and Recall systems or RR systems are followed in healthcare setup to remind people regarding vaccination dues (reminder) and late (recall). These are delivered via various mediums like telephone, mail, postcard, letter etc and are mostly client specific or may contain educational content too. ^[29] An experimental study was conducted in 2018 among south Indian nursing mothers to assess the efficacy of SMS (short message services) upon vaccination rates. The population was divided into interventional and control groups with the former enrolled for SMS facilities. The study concluded that immunisation reminder system was successful in increasing vaccination coverage and this can be a novel step for Indian health care facility.^[30]

- Vaccine delays are another remarkable factor that made child population vulnerable to infectious diseases and serious illness. Poor manufacturing capacity adding to low quality production coherently explains the diminishing success of polio vaccination programs in India. Low quality vaccines can also precipitate immunisation related adverse events generating poor public trust and more antivaccine advocates. Government interferences allocating only 2.1% of health funds for routine immunisation have also added to the burden.^[12]

- Immunisation procedures starting from procurement till administration of vaccines demand lots of qualified personnel and man hours. Shortage of trained personnel in this regard may negatively impact areas like vaccine procurement, disease surveillance, effective vaccine management, awareness schedules and adverse event monitoring and reporting. ^[31]

SOLUTIONS

The broad list of challenges mentioned here created an insight to the under achievement of vaccination rates in many regions in India. Identifying those under vaccinated regions and implementing new interventions will create transition in immunisation rates. According to the

past reports, community health care workers made huge change in the rate of immunisation in India rather than any other interventions^[12]. Therefore, pharmacists can actively participate in the national, state, district and block level vaccination delivery centres to achieve the goal. Developing programmes to expand the routine immunisation in the country can ensure vaccination in 90% of infants by 2020.

- The challenges that arise from the family will narrow the demand for immunisation to a larger extent in rural areas. Poor knowledge on vaccines and the misconceptions about adverse effects can be alleviated with proper communication with the public^[12]. Pharmacists can play a vital role in this area by creating a trustful bond between health care workers and society. Pharmacists being easily accessible and possessing professional knowledge, act as effective educators providing proper information on benefits of vaccination and possible side effects such as fever and sore arms that might subside after few days.

- The review on 'Evidence of the role of community workers', suggests that India spends only 2% of its total health budget on immunisation leading to rapid decline in the vaccination rates^[12]. Adding to this, rural areas are the vulnerable districts in India where vaccine preventable diseases are one of the causes of infant deaths. Since the launch of Universal Immunisation Programme (UIP), Government extended programmes to rural regions and provided immunisation free of cost for 12 vaccine preventable diseases^[15]. Thus, establishing programs under UIP can eradicate most of these deadly diseases from the country.

- Technical and provider barriers solemnly create non adherent citizens to immunisation. The lack of trained personnel in national and state level adversely affected the implementation of immunisation in India. Government has to appoint trained professionals for vaccine procurement, its management and disease surveillance. The proper maintainance of records on vaccination schedules can effectively boost the rates to desired levels. The hospitals can actually distribute vaccination cards along with OP cards to increase the awareness of the public. They can implement more initiatives to drag health professionals such as pharmacists to the field of vaccination and its administration. Indian government introduced new plans for reducing the provider barriers, for instance, the Mission Indradhanush published new initiatives in vaccine logistics and cold chain management. This is the most anticipating goal of new plan in India with the system of Electronic vaccine intelligence network (eVIN) aiming to digitalize the stock, logistics and the temperature of vaccine storage from the level of national to sub districts^[15]. Another initiative is National Cold Chain Management

Information System (NCCMIS) which enables to track the cold chain functionality. The six phases of this plan aims to increase the full immunisation coverage by 90%.^[15]

- The system barriers are another area need of concern in implementing new plans. The remainder and recall systems might change the system of vaccination existing in India. Maintaining vaccination record books, remainder systems like SMS, telephone, letters on dues help people to stick to their schedules. The low quality production of vaccines in India made people to lose their trust due to the adverse effects. This issue can be prevented by strictly auditing the industries to check whether they are following the standards under World Health Organization (WHO) and testing the quality of vaccines of each batch.
- Providing incentives to people in rural areas would be more effective than campaigns. A randomized controlled trial demonstrated the effect in villagers by benefiting them with non-financial incentives on immunisation. Other better solution to improve the rates would be the monthly immunisation camps in selected subcategories. This system improves the drive in people who are having myths about vaccination. These camps will help the trainee health care professionals to take part in community health care to get perfectly grounded. The colleges can provide these facilities to their intern students by giving monthly routine postings in primary health care centers. This may reduce the working burden of doctors to a greater extent. Paramedical students get more benefit from these immunisation camps and people become more aware about the need for immunisation.^[12]

Thus, by maintaining a proper balance in spending money for vaccine production, routine immunisation and making free of cost vaccines to the public can eradicate most of these vaccine preventable diseases. Pharmacist's role in health care system has narrowed to the area of dispensing medicines in India but, they can effectively implement better communication with the public, can educate them and administer the vaccines with proper recording, followed by addressing any adverse effects and reporting them.

CONCLUSION

Overcoming the multifactorial barriers through effective strategies would increase the role of pharmacists as vaccinators, thereby surging the vaccination rates among public. Upon comparison with countries like Australia, New Zealand, Canada, Ireland, Portugal, United States of America and United Kingdom, India hasn't reformed the role of pharmacists as immunizers to a demanding extent. Near future demands potentially trained pharmacists who

can safely administer medications and manage adverse reactions to fight pandemic and epidemic severities. Appropriate training and legislature support can uniquely position pharmacists to triumph in the areas of immunisation.

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