

Knowledge attitude and practices of pneumococcal vaccines in India

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Abstract

Introduction: Pneumococcal conjugate vaccines (PCV) have revolutionized the prevention of invasive pneumococcal disease (IPD) globally. The initial 7-valent (PCV7) vaccine has gradually been replaced by higher valency vaccines such as PCV10 and PCV13, as these cover additional serotypes causing increased immunization. **Objective:** The purpose of this study was to determine the overall attitude and practices of the Indian public toward PCV for their infants. **Materials and Methods:** Data were collected over a period of 18 months from a tertiary perinatal center. Pneumococcal vaccine leaflets with current, unbiased information on PCV10 and PCV13 were circulated to parents, who were then asked to opt for either one or none of the vaccines for their infants at their 6 weeks immunization check-up. **Results:** A total of 3406 infants came for follow-up. Among them, 84% chose to give the PCV while the remaining 16% opted out. Among the parents that opted for the vaccines, 90% chose PCV13 over PCV10. This may be attributable to its increased immunogenicity and broader serotype coverage as understood by the parents - who seem to want the best for their children. **Conclusion:** PCV13 was a preferred vaccine of choice for infants by majority of the parents, as compared to PCV10. Such information is of valuable importance in deciding which vaccine to go for if and when India goes for PCV in the future with Global Alliance for Vaccines and Immunization and United Nations Children's Fund funding.

Key words: Attitude, Invasive pneumococcal diseases, Pneumococcal conjugate vaccine, Pneumococcal conjugate vaccine 10, Pneumococcal conjugate vaccine 13, Practices

Pneumococcal vaccines are designed to prevent diseases caused by *Streptococcus pneumonia* (pneumococci); broadly referred to as pneumococcal diseases. Currently, two different types of vaccines are available for prevention of pneumococcal diseases, namely conjugate vaccines and polysaccharide vaccines. Pneumococcal conjugate vaccines (PCV) have revolutionized the preventive measures by decreasing the invasive pneumococcal disease (IPD) across the world since their introduction in 2000 [1,2]; however, it was not until 2006 when the PCV7 vaccines became available in India. The conjugate vaccines function by inducing an immune memory response, and are immunogenic in young infants. In contrast, the pneumococcal polysaccharide vaccines are poorly immunogenic in children under the age of 2 years and in those with impaired immunity. Although they contain more serotypes, they are not conjugated to a protein and hence, do not induce a memory immune response [3].

Among the PCV, formulations vary by the number of pneumococcal serotypes included (valency) and the conjugating proteins used. Initially, these vaccines were only made available in various developed countries [4]. Subsequently, many national programs have made them part of their vaccines' regime, being

given free to the children based on disease surveillance and various other factors. India is one of the few countries where the pneumococcal vaccination is available to the public on private prescription and the original PCV7 conjugate vaccine has now been superseded. The public has to decide which one to choose among the available PCV10 (synflorix) and PCV13 (prevenar13). PCV10/PCV13 is not yet available on Extended Program of Immunization.

The objective of the present study was to assess the awareness of PCV among the public through educational leaflets and to evaluate which vaccine they chose. A study was conducted to determine the attitude and practices of pneumococcal vaccines among the general public in India.

MATERIALS AND METHODS

Prospective data over a period of 18 months from November 2011 to May 2013 were collected from Cloudnine Hospital, Bengaluru, Karnataka, India - a tertiary perinatal center with over 2000 deliveries per year. Ethics Committee approved the study since there were no interventions carried out on any babies, and no blood or body fluid samples were collected.

Pneumococcal vaccine leaflet for information was prepared based on the current available knowledge, and the serotypes they cover including the information about the disease. This leaflet was shown to both PCV10 and PCV13 company personnel for their satisfaction to ensure that it contains appropriate scientifically available information, and covered the vaccines currently available along with their serotypes as depicted in Table 1.

As per the hospital protocol, the leaflets containing information on pneumococcal vaccines (both synflorix - PCV10 and prevenar13 - PCV13) were distributed among all parents during their visit for the 10 days check (post delivery). The designed leaflets were unbiased and provided information about the vaccines available in the current literature at the time of printing the leaflets. A copy of the leaflet is enclosed for the reader's perusal along with the manuscript (Web table). They contained information on the cost, benefits, availability of the vaccines, dosing schedule, and additional details, in order to prepare the parents for vaccination at 6 weeks. In addition, all parents were asked whether they have read the leaflet, if not it was ensured that they read it before the vaccination was decided.

RESULTS

During the study period, 3624 babies were born in the hospital, out of which 3406 (94%) came for follow-up and vaccinations. Majority of the 6% (218/3624) babies who did not come at 6 weeks were because they went to their native place to spend time with their parents or moved interstate for various other reasons.

At the 6 weeks check for vaccinations, most parents (84%; 2861/3406) chose to give the pneumococcal vaccine to their infants, with only 16% (545/3406) of parents choosing otherwise and quoting that it is an optional vaccine and they would want to give it later or wanted some government recommendations. Among the parents who chose to give the pneumococcal vaccine to their infants, 90% (2575/2861) opted for the PCV13 vaccine, while 10% (286/2861) chose PCV10 (Figure 1).

DISCUSSION

This study evaluated the awareness of pneumococcal vaccines among the general public in India and determined which conjugate vaccine was opted by the majority. The public was informed through educational leaflets, specifically designed to share unbiased information from current literature on two PCV i.e., PCV10 and PCV13.

Majority of the parents chose to give pneumococcal vaccines to their infants (84%), while a smaller sum opted out. This study projects to the increased awareness and improvement in attitude among the general public toward realizing the importance of immunization for their infants through education and providing best available healthcare medications to them. Among the parents who chose to give the vaccines to their infants, majority (90%) went ahead with PCV13. While both vaccines have revolutionized the treatment of IPD in children across the world, they hold a greater value for the Indian population.

Prior to the existence of the universal infant PCV programs, about 85% of pneumococcal diseases in the Western countries in children below the age of 2 years were caused by the serotypes present in the 7-valent (PCV7) conjugate vaccine, while in India, only 47-50% of IPD in children were thought

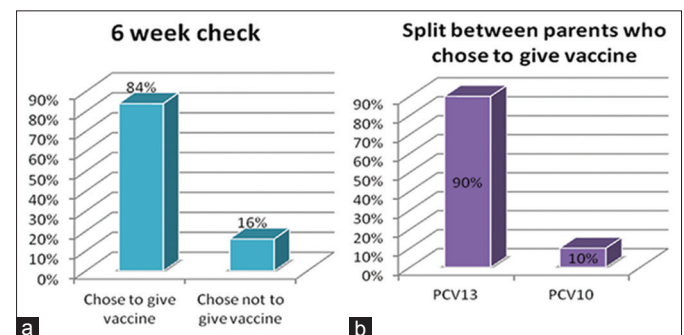


Figure 1: (a) Percentage that opted for pneumococcal conjugate vaccine versus the remaining. (b) Comparison between pneumococcal conjugate vaccines 13 and pneumococcal conjugate vaccines 10 parent population

Table 1: Pneumococcal vaccines and their serotypes

Vaccine type	Valency (brand name)	Conjugating protein	Shared serotypes	Additional serotypes
Conjugate vaccines	7-valent (Prevenar)	Non-toxic <i>Corynebacterium diphtheria</i> CRM ₁₉₇ protein	4, 6B, 9V, 14, 18C, 19F, 23F	-
	10-valent (Synflorix)	Protin D from non-typeable <i>Haemophilus influenzae</i> , tetanus toxoid and diphtheria toxoid	4, 6B, 9V, 14, 18C, 19F, 23F	1, 5, 7F
	13-valent (Prevenar 13)	Non-toxic <i>Corynebacterium diphtheria</i> CRM ₁₉₇ protein	4, 6B, 9V, 14, 18C, 19F, 23F	1, 5, 7F, 3, 19A, 6A
Polysaccharide vaccine	23-valent (Pneumovax 23)	None	4, 6B, 9V, 14, 18C, 19F, 23F	1, 5, 7F, 3, 19A, 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, 33F

to be covered with those serotypes. Hence, the uptake of the vaccines by the Indian pediatricians was patchy at the most. The different serotypes vary in their propensity for nasopharyngeal colonization and for causing the disease. Now, there are two vaccines PCV10 and PCV13 that are available. Among the two vaccines, PCV13 is expected to have a substantial impact on the overall public health as well as cost-effectiveness in healthcare, as it demonstrates greater immunogenicity and broader serotype coverage as compared to PCV10. This prevents additional cases of pneumococcal diseases among children, hence factoring for the cost utility as well. PCV13 also greatly helps in reducing cases of preventable diseases in India [5-7].

Any country willing to include a new vaccine in its immunization schedule refers to the WHO recommendations and current literature around the world, along with their own epidemiological data. India is a vast country, but our epidemiological data for pneumococcal diseases is lacking in several ways. The available epidemiological data is patchy and insufficient. Hence, the decision to include a particular vaccine in our immunization schedule is highly dependable on the research from other developing nations, which is simply extrapolated from demographically similar places as our country. Although, International bodies such as the Global Alliance for Vaccines and Immunization and United Nations Children's Fund have been willing to provide these vaccines at a reasonable cost to the developing countries for early introduction, India has been relatively slow in requesting for their help in introducing pneumococcal vaccines for the Indian population. In the future, when we take a decision to seek their help, our country will require plenty of local data in the form of analyses, and cross-sectional as well as observational studies, to convince the deciding bodies in order to justify procuring the vaccines.

With studies such as ours that are performed on general public, disease surveillance goes a long way in contributing toward the efforts to choose the appropriate vaccine for the population. It is essential for a country to recognize these vaccines and make them available through International bodies or other means.

CONCLUSION

In conclusion, our study highlights that there is an increased awareness among the general public in India toward opting for optional immunization measures to ensure the overall health

and safety of their infants. It was observed that the majority had a positive attitude toward information in the educational leaflets. This study also demonstrated that PCV13 is a highly favorable vaccine among the Indian population as compared to PCV10. This information would be of great importance in developing immunization programs and awareness campaigns within our country. Further studies with larger population and different hospital settings may contribute toward better data specific to the Indian public.

REFERENCES

1. Black S, Shinefield H, Fireman B, Lewis E, Ray P, Hansen JR, et al. Efficacy, safety and immunogenicity of heptavalent pneumococcal conjugate vaccine in children. Northern California Kaiser Permanente Vaccine Study Center Group. *Pediatr Infect Dis J*. 2000;19(3):187-95.
2. Are current recommendations for pneumococcal vaccination appropriate for Western Australia? The Vaccine Impact Surveillance Network – Invasive Pneumococcal Study Group. *Med J Aust*. 2000;173 Suppl: S36-40.
3. Nuorti JP, Whitney CG, Centers for Disease Control and Prevention (CDC). Prevention of pneumococcal disease among infants and children - use of 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine - recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2010;59 RR-11:1-18.
4. Kyaw MH, Bramley JC, Chalmers J, Jones IG, Campbell H. Pneumococcal vaccination: O pinion of general practitioners and hospital doctors in Scotland, 1999-2000. *Commun Dis Public Health*. 2001;4(1):42-8.
5. Earnshaw SR, McDade CL, Zanotti G, Farkouh RA, Strutton D. Cost-effectiveness of 2 + 1 dosing of 13-valent and 10-valent pneumococcal conjugate vaccines in Canada. *BMC Infect Dis*. 2012;12:101.
6. Klok RM, Lindkvist RM, Ekelund M, Farkouh RA, Strutton DR. Cost-effectiveness of a 10- versus 13-valent pneumococcal conjugate vaccine in Denmark and Sweden. *Clin Ther*. 2013;35(2):119-34.
7. Castañeda-Orjuela C, Alvis-Guzmán N, Velandia-González M, De la Hoz-Restrepo F. Cost-effectiveness of pneumococcal conjugate vaccines of 7, 10, and 13 valences in Colombian children. *Vaccine*. 2012;30(11):1936-43.

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