

## ORIGINAL RESEARCH

# To Assess the Role and Knowledge of Paediatricians in Provision of Quality Immunization Services in Private Sector in Central India

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### ABSTRACT

**Background:** The paediatricians in the private sector in India can play an important role in providing vaccine service delivery and immunization coverage. Standards and systems for service quality of private providers should be established by countries. Standards should include practices in all facilities delivering vaccines, including proper storage and handling, appropriate use of injections, proper recording and adherence to safety measures, and waste management and disposal. [1] There is also a need to have co-partnership and communication with private providers to improve the performance of health system in long term. **Methodology:** A cross sectional study was conducted in urban area of Bhopal city. Knowledge and adherence to standard guidelines related to vaccination practices were assessed. Total 110 paediatricians were found eligible for the present study. After excluding 10 paediatricians who refused to participate, finally, 100 paediatricians were involved (responded) giving response rate of 90.9%. Pre-designed; pretested questionnaire was used for data collection. **Results:** In this study, the study population were paediatricians providing vaccination in private clinics and private hospital. Most of the private providers 50% were in between 41 to 60 age group, 81% paediatricians were trained and 82% immunization clinics were registered to Government sector. Out of total respondents (76/100) 76% answered correctly on all knowledge item questions. Most respondents 76% had complete knowledge score on cold chain vaccine. Mean (SD) for knowledge score was 96.3(±7.61) ranging from 70 to 100. **Conclusion:** Knowledge of majority of paediatricians were good, for success of NIP (National Immunization Program), it is necessary to increase the private sector involvement in the area of immunization delivery.

**Keywords:** Immunization, Private sector, Monitoring

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### INTRODUCTION

Vaccines are one of the safest way that provide protection to our children from diseases which may lead to morbidity and mortality in long run. For over two centuries, vaccine have safely reduced the suffering from diseases like polio, measles and smallpox. Immunizations are component of basic health services which are provided by the government sector, but private sector also play crucial role in provision of immunization service delivery. The WHO produced a guidance note to assist countries in improving their collaboration with private providers in the delivery of immunization services. With involvement of private

sector not only results in increase in vaccination coverage and equity of services, it also improves the quality of immunization services delivered. [1,2]

In all countries private sector health services exists, which defines the private sector as, "all health-care providers who are present outside the public sector, whether their aim is for charitable or commercial purposes." [4,5] Lahariya et. al in his findings enforces that In countries where a health-care provider is both a government and private provider, questions arises about incentives for providers to refer public sector vaccination to their private fee-based setting. In these countries inequity in health services may develop

where the private sector reaches higher vaccination coverage in the population it serves because of financial incentives to the provider by vaccine producers [6]. Private immunization providers can work full-time in the private sector or work part-time in both private and government sectors. In school and occupational health settings, private providers can also provide immunization services.<sup>[7]</sup>

Demographic health surveys (DHS) does not provide clear information about location of vaccination delivery (private vs public sector). Service provision assessment (SPA) health facility surveys provide some comparison of vaccination service delivery characteristics by public and private ownership categories.<sup>[8]</sup>

Immunization set up of private providers and their place of work should get registered under government registry of practitioners.<sup>[9]</sup> In countries where vaccines are procured by the Ministry of Health (MOH) and then distributed to private providers<sup>[3]</sup>; has the advantages of increased control and standardization of vaccination messaging.

Private providers' must use those routine vaccines and immunization schedules, which are defined or specified in their country's national immunization schedule. Modifications of vaccination schedules and use of different vaccines can lead to increased risks of vaccine preventable diseases in populations not covered by the private sector.<sup>[10]</sup>

There are different types of immunization schedules in private sector and public sector followed in developing countries, including India.<sup>[11,12]</sup> The pediatricians and health care providers are free to follow the immunization schedules of their choice. Information on immunization practices among pediatricians are very scarce from many developing countries. In countries like India there are several newer vaccines available which are used by private immunization providers, which include expensive combination vaccines with less documented adverse effects of the available new vaccines.<sup>[13]</sup>

The cold chain still remains a highly vulnerable element of any immunization programme, both in developing and in developed countries. Vaccine manufacturers recommend storage conditions for their vaccines and clearly state that they do not guarantee the potency of the vaccines if they have not been stored at correct temperature.<sup>[14]</sup>

The measles epidemic in the United States during the period 1989–1991 revealed the weakness in immunization delivery system. The cause of this was failure to vaccinate children at the recommended age of 12–15. Standards for Pediatric Immunization Practices were developed with consensus of the National Vaccine Advisory Committee (NVAC) by CDC in collaboration with public and private agencies after consulting various concerned health departments and public and private providers providing clinical care and preventive health services.<sup>[15]</sup>

It is to be ensured that clients satisfaction and appropriate, high-quality immunization services should be

provided by private immunization providers. With these objectives study was conducted to know the role of paediatricians in terms of client satisfaction for quality service delivery and to assess knowledge on immunization practices.

## MATERIALS AND METHODS

We conducted across sectional study between December 2018 to May 2020 in urban area of Bhopal city. All pediatricians of private sector, who provide vaccination services and store vaccines in the clinics were included and those who do not store vaccines and not practising vaccination in private were excluded in the study.

Non probability (convenience) sampling method was used. A list of all private providers of immunization services was obtained. Taking the margin of error 0.05 at 95% confidence interval the minimum required sample size was 100. After considering 10% as non-response rate, the sample size calculated was 110. A total of 166 paediatricians were invited to participate in the study. Out of 166 paediatricians, 40 practiced in public system and 16 clinics who denied providing any vaccination as they said that they did not practice vaccination. Of the total 110 were eligible to participate in this study who were providing vaccination. After excluding 10 paediatricians who refused to participate and finally, 100 from 110 paediatricians were involved giving an overall provider response rate of 90.9%. Out of total 110 private providers 100 were respondents and 10 were non respondents.

In this study pre-designed; pretested questionnaire for interview regarding delivery of immunization services were used. Knowledge questionnaire were offered to private immunization providers which consists of questions on general aspects on cold chain, good vaccine care, good refrigerator care and temperature reading. Questionnaire given to private providers consists of 10 items on knowledge. Each question carried equal marks of 10, so respondent should score out of 100. Respondents scoring 100% were considered to be of complete knowledge. After obtaining appointment on phone from the pediatricians, they were asked to sign the informed consent form before start of the study.

Statistical analysis was done using Excel Spread sheets. Data was analysed using the SPSS (Statistical Package for Social Sciences) version 11.5. A p-value of <0.05 was considered significant.

There was no conflict of interest.

## RESULTS

In this study, the study population were paediatricians providing vaccination in urban area of Bhopal city, Madhya Pradesh. Table 1 show characteristics of private immunization providers. Most of the private providers 50% were in between 41 to 60 age group. In our study 81% paediatricians were trained, 82% immunization clinics followed the guidelines as Gov-

ernment norms. Most of the pediatricians 90% followed the IAP schedule rather than Govt. recommended National schedule i.e. only 8% and 2% followed both immunization schedule. This study re-

vealed, 76% of respondents had complete knowledge on cold chain practices and 24% had partial knowledge. Mean (SD) for knowledge score was 96.3(±7.61) ranging from 70 to 100. (Table 1)

**Table: 1 Sociodemographic Characteristic of respondents**

Variables	Categories	n(%)	Mean (SD)
Age (years)	20 – 40 years	43 (43%)	35.63± 3.28
	41 – 60	50 (50%)	48.42± 5.94
	61 -80	7 (7.0%)	67.71± 6.34
Sex	Male	75 (75%)	
	Female	25 (25%)	
Patient load	No. of patients per day		18.45+ 2.64
	Vaccination per week		11.69 +-1.24
Qualification status	Diploma in Paediatrics	29 (29%)	
	MD in Paediatrics	71 (71%)	
Training	Yes	81 (81%)	
	No	19(19%)	
Dedicated cold chain equipment used	Yes	32 (32%)	
	No	68 (68%)	
Dedicated person	Yes	82 (82%)	
	No	18 (18%)	
Practice of National Immunization			
Schedule	Yes	8 (08%)	
	No	92 (92%)	
Source of vaccine procurement	Private agency	92 (92%)	
	Government supply	4(04%)	
	Both	4(04%)	
Knowledge	Complete	76(76%)	
	Partial	24 (24%)	

Most of the paediatricians (MD in Paediatrics) 53 (74.6%) had complete knowledge on immunization practices. 29 (29%) were Diploma holders in Pediatrics with complete knowledge. 61 (75.3%) trained practitioners and 64 (78%) registered immunization clinics had complete knowledge. This study shows that only 27% of private providers were aware of storing vaccines in dedicated refrigerator, while majority 68% were storing vaccines in domestic refrigerator. 11.1% practitioners with partial knowledge, were storing vaccines in dedicated refrigerators as compared to 88.9% practitioners with complete knowledge. Majority of private providers with complete knowledge 50(73.5%) were storing vaccines in domestic refrigerator as compared to 18 (26.5%) with

partial knowledge. Visible temperature log was present in 62 (75.6%) of refrigerators of practitioners with complete knowledge. 69% of refrigerator had thermometer to record temperature, out of this 52 (75.4%) private practitioners with complete knowledge were aware of keeping thermometer in their refrigerator as compared to 20 (24.6%) with partial knowledge. 78% of practitioners were recording temperature two times daily and once a day by 8% and 7% knew that there is no need to record. Temperature is recorded two times daily by 64 (82.1%) practitioners with complete knowledge as compared to 14 (17.9%) practitioners with partial knowledge. (Table 2)

**Table: 2 Association of socio-demographic profile with knowledge of Private Providers**

Variables	Complete Knowledge	Partial Knowledge	P value
(n= 76)	(n= 24)		
n(%)	n(%)		
Sex			
Male	57 (76%)	18 (24%)	0.615
Female	19 (76%)	06 (24%)	

<b>Religion</b>			
Hindu	69 (77.5%)	20 (22.5%)	0.453
N. Hindu	07 (63.6%)	04 (36.4%)	
<b>Qualification status</b>			
MD in Paediatrics	53 (74.6%)	18 (25.4%)	0.791
Diploma in Paediatrics	23 (79.3%)	06 (20.6%)	
<b>Training</b>			
Yes	61 (75.3%)	20 (24.7%)	0.499
No	15 (78.9%)	04 (21.1%)	
<b>Dedicated person</b>			
Yes	64 (78%)	18 (22%)	0.363
No	12 (66.7%)	06 (33.3%)	
<b>Cold chain equipment used</b>			
Dedicated refrigerator	24 (88.9%)	03 (11.1%)	
Domestic refrigerator	50 (73.5%)	18 (26.5%)	0.043
ILR	02 (40%)	03 (60%)	
<b>Temperature is recorded</b>			
Once a day	04 (50%)	04 (50%)	
two times a day	64 (82.1%)	14 (17.9%)	0.004
many times, a day	06 (85.7%)	01 (14.3%)	
No need to record	02 (28.6%)	05 (71.4%)	

Majority 99% of private providers in the current study knew about optimal temperature. Knowledge items that were weak were shifting of vaccine to another refrigerator is required if power failure occurs more than 72 hours (12%) and thermometer is placed in the lowest shelf of general compartment in the refrigerator (7%). In the present study 95% of respondents knew that vaccine will be spoiled if exposed to frozen state and 98% knew that vaccine will be spoiled if

exposed to heat. Majority (99%) respondents had correct knowledge that vaccines cannot be placed with food and beverages, 96% knew that placement of vaccine at refrigerator door and at the lowest compartment (96%) are wrong practices. Most of the respondents (93%) answered that thermometer is not placed in the lowest shelf of general compartment in the refrigerator. (Table 3)

**Table: 3 Distribution of Frequency of Correctly Answered “Knowledge” Items of Private Immunization Provider**

Knowledge	Items	Correct answers frequency
(%) N=100		
<b>1. General aspects</b>		
	2-8 <sup>0</sup> C is an optimal temperature for cold chain.	99(99%)
	Shifting of vaccine to another refrigerator is required if power failure occurs more than 72hours.	88(88%)
<b>2. Good vaccine care</b>		
	Vaccines will be spoiled if exposed to frozen state	95(95%)
	Vaccines will be spoiled if exposed to heat	98(98%)
	Placement of vaccines with food and beverages in the refrigerator	99(99%)
	Placement of vaccines at refrigerator door	96(96%)
	Placement of vaccines in the lowest compartment of refrigerator	96(96%)
<b>3. Good refrigerator care</b>		
	Good refrigerator care is by placing it near to sunlight, stove or microwave	100(100%)
<b>4. Temperature readings</b>		
	Thermometer is placed in the lowest shelf of general compartment in the refrigerator	93(93%)
	Recording of temperature in the temperature chart is not required	98(98%)

## DISCUSSION

For a success of any immunization program in country correct knowledge, attitude and practice of cold chain is very important. This study provides knowledge and important findings related to vaccination practices in the private sector in India. The response rate of our study was 90.9% which is similar with prior studies among paediatricians.<sup>[16,17]</sup> This study revealed, 76% of respondents had complete knowledge on immunization practices, the study done by B Azria et al., found 78.7% had adequate knowledge.<sup>[17]</sup>

## KNOWLEDGE ON COLD CHAIN PRACTICES

Majority 99% of private providers in the current study knew about optimal temperature which is similar with the study done by B Azria et al., who found 95.5% in his study,<sup>[17]</sup> this shows that most of them were attended training on cold chain, while study done by Lilian Yuan et al., Yogini Thakker et al., and Paloma Ortega et al., reported less percentage.<sup>[29,23,30]</sup>

This study also brings out the fact that 88% respondents had correct knowledge about need to shift vaccines if power failure occurs more than 72 hours which is consistent with a study by Denise DeRoock et al.<sup>[31]</sup> Despite more working experience, 12% of pediatricians had inadequate knowledge about need to shift vaccines if power failure occurs more than 72 hours. In the present study 95% of respondents knew that vaccine will be spoiled if exposed to frozen state and 98% knew that vaccine will be spoiled if exposed to heat. However, study by B Azria et al., have reported that 88.8% respondents knew that vaccine can be damaged by freezing or heat (98.8%).<sup>[17]</sup> Other studies show that 65.9% did not know that vaccine can be damaged by freezing (21) or heat 18%.<sup>[32]</sup>

In this study majority (99%) respondents had correct knowledge that vaccines cannot be placed with food and beverages, 96% knew that placement of vaccine at refrigerator door and at the lowest compartment (96%) are wrong practices. B. Azria et al., found that 97.8% had correct knowledge that vaccines cannot be placed with food and beverages and 14.6% knew that placement of vaccine at refrigerator door and placement at the lowest compartment (16.9%) are wrong.<sup>[17]</sup> Regarding placement of thermometer, most of the respondents (93%) answered that thermometer is not placed in the lowest shelf of general compartment in the refrigerator, while B Azria et al., reported 66.3%. Most of the respondents (98%) answered that recording of temperature in the temperature chart is required. In study done by B Azria et al., only 6% had correct knowledge on recording of temperature.<sup>[17]</sup>

In this study knowledge on general aspect was the weakest. 88% of practitioners knew to shift vaccines if power failure occurs more than 72 hours which is consistent with the study done by B. Azria, where three fourth respondents agreed that they need to shift vaccines if power failure occurs more than 72 hours. Another study by Efe E, A-Neel S et.al.<sup>[33]</sup> found that

two third of the of respondents knew the exact procedure for protection of vaccines in condition of power failure.

## CONCLUSION

Majority of pediatricians had good knowledge on immunization practices, despite this most of them were not following the cold chain guidelines. Regular training and strict adherence to cold chain guidelines as well as enforcement of law may improve the practice necessary to maintain cold chain.

## RECOMMENDATION

Private immunization providers must adhere to cold chain guidelines and improve the quality services to maintain cold chain. A dedicated person should be appointed to monitor vaccine storage and management so that cold chain is not compromised. Regular training is recommended for cold chain maintenance. It is good practice to keep in touch with newer research in vaccines and that should be shared with public system.

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