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Original Research Article

A study on immunization practices amongst private medical practitioners of Bhopal city in central India

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ABSTRACT

Background: WHO advocates and highly recommend that National Immunization Programmes (NIPs) should increase collaboration and communication with private providers delivering vaccination services to ameliorate the purpose immunizing beneficiaries efficiently.
Methods: It is a cross sectional observational study. It is done to assess immunization practices and other rel-evant aspects amongst private paediatrics practitioners of Bhopal city.
Results: After doing appropriate statistical analysis, results revealed that most of the cold chain practices, vaccine administration practices, record keeping and reporting mechanisms were not up to the mark (i.e. p values < 0.05 at 95% confidence interval). However, training and level of experience contributed to improve in certain practice outcomes.
Conclusions: Quality of immunization services in private sector could be enhanced by providing training and support to private immunization service providers.

Keywords: Immunisation program, Private practitioners, Vaccination practices, Audit, Bhopal

INTRODUCTION

When immunizing agent is inoculated in the form of a vaccine there is induction of immune response, this process is known as immunization. So, immunization is important part or component of the human right to health and prevention of communicable diseases. In 2012, the World Health Assembly adopted the Global Vaccine Action Plan (GVAP) whose aim was to provide equitable access to vaccines by 2020, the full benefits of immunization to all people, regardless of where they are born, who they are, or where they live can be achieved through shared responsibility of various groups involved in providing healthcare.[1]

In April 2016, the WHO's, Strategic Advisory Group of Experts (SAGE) had a focus on implementation of immunization program that results into health system strengthening and universal health coverage which requires internal support and integration between various healthcare sectors.[2]

For full benefits of immunization, coverage of vaccination has to be increased and more than this potent vaccine should reach the beneficiaries for which cold chain maintenance is a must. The cold chain consists of a series of links that are designed to keep vaccines within WHO recommended temperature ranges from the point of manufacture to the point of administration.[3]

It is highly recommended to strictly stick to cold chain requirements to maintain potency of vaccine and thus failure to stick to cold chain requirements may reduce vaccine potency and can result in lack of protection

against VPD (vaccine preventable diseases) and/or increased local reactions after administration of vaccine.[4]

WHO advocates and highly recommend that National Immunization Programmes (NIPs) should increase collaboration and communication with private providers delivering vaccination services regardless of the relative contribution of private providers to the delivery of vaccination. It is recommended by WHO that all practitioners doing vaccination in the private sector should undergo training on immunization, current schedules, new vaccines, storage, cold chain management, vaccine vial monitors, communication, advocacy, multiple injections, adverse events and notifiable disease reporting.[5] Government of India and UNICEF and a study by Mitrovich et al. on the private sectors contribution to immunization service delivery in low, middle, and high-income countries observed that private practitioners provide an estimated 21% of vaccinations in urban centres of India, and are important partners in achieving high vaccination coverage.[6,11]

The aim and challenge of national immunization programmes is to attain the target of high vaccination coverage. Engagement of public sector with the private sector and their collaboration, can increase the vaccination services and can improve the programme and thus increase the coverage, this is only possible if the roles of private sector is clearly defined and the services are collaborative with the existing health system and standards.[7] The Universal immunization program targets around 27 million surviving infants and 30 million pregnant women annually.[8]

Despite significant decline in the incidence of vaccine preventable diseases, India is responsible for 30% of the annual global cohort of unvaccinated children worldwide.[9] Globally the pooled prevalence of missed opportunities for vaccination (MOV) for children, in which a child eligible for vaccination, with no valid contraindication, visits a health service centre and does not receive all recommended vaccines, is estimated at 32% among low- and middle- income countries. The goal set to achieve full immunization of 90% of world children by 2000, has not been achieved, and one of the major contributors is MOV.[10] Reasons were related to service providers, the parents and the immunization system. Most reported reasons related to service providers were immunization cards not reviewed, no administration of vaccine simultaneously and perceived contraindications of concurrent illness. From parent's side the most common reasons were immunization card not available, forgetfulness in bringing the child to the vaccine provider and concurrent infection. Where as in immunization system, inadequacy of monitoring and supervision of vaccine coverage and collaboration with the private sector are the main weaknesses.

Monitoring and supervision of private provider vaccination delivery and participation in adverse event and disease surveillance activities even in high-income countries where there is adequate government infrastructure and mechanisms to capture this information, reporting is often suboptimal.

Inadequate reporting from the private sector results in loss of information on coverage, vaccine-preventable disease incidence, and adverse events, which can affect planning, prioritization, resource allocation, and timely response to outbreaks and vaccine safety concerns.[11]

A study in India found that 31% of private providers reported vaccine doses to the Government and 69% providers commonly responded that they would not report cases that met surveillance definitions for vaccine preventable notifiable diseases, including measles and polio. The most common reason given was unawareness of any reporting requirement, and not knowing where or how to report.[12] In general, private providers closely followed the IAP- recommended vaccination schedule rather than the UIP schedule.[13]

The challenge of national immunization programmes can only be fulfilled by increasing the vaccination coverage. In order to achieve the national vision of reaching and sustaining routine immunization coverage of 90% for all vaccines by the year 2020, there is a need to involve both the private and public health facilities in providing immunization services. Parents are paying extra amount to private sector as compared to public sector to get maximum benefit of immunization. So, child should receive potent & effective vaccines.

The present study was conducted to know the immunization practices followed by private providers in terms of safety and quality of service delivery, recording and reporting mechanism, cold chain status and injection safety practices, offering a wider selection of newer and updated vaccines as compared to public sector.

METHODS

A cross sectional study was conducted in urban area of Bhopal city, from December 2018 to May 2020. Bhopal, the state capital of Madhya Pradesh has a population of 2,390,000. All private medical practitioners, who provided vaccination services and who store vaccines in their set up were included in the study and gave consent to participate in the study. AYUSH doctors, part time doctors and clinics, hospitals outside the city and those who do not store vaccines in their private set up were excluded.

Non probability (convenience) sampling method was used. A comprehensive sampling frame of all private providers of immunization services in Bhopal city was constructed by consulting local branches of paediatrician association (IAP association, Bhopal) and association of general practitioners (IMA, Bhopal). In total, 164 paediatricians were identified. All of them were invited to

participate in the study. Out of these 164 paediatricians, 40 practiced in public system and 20 clinics based paediatrician denied that they provide vaccination through their clinics. Thus total 104 paediatricians were eligible for the present study. Out of these 104 paediatricians, 19 paediatricians refused to participate in the study. Thus finally, 85 paediatricians were involved, giving an overall non-response rate of 18.3%.

Tools and technique

In this study predesigned; pretested questionnaire for interview and structured checklist for on-site observation to assess knowledge, attitudes, and practices of private immunization service providers regarding delivery of immunization services were used. Each assessment includes administration of an in-person structured questionnaire, which captured information on immunization practices related to vaccination administration practices, record-keeping of vaccine and reporting of vaccination coverage, cold chain practices and injection safety practices. Vaccine refrigerators examined for the presence of thermometers and temperature logs and non-vaccines items including food and other medications and the vaccine vial monitor (VVMs) observed and interpretation done based on expired stage examined.

Data collection

Appointment with the participant on phone was taken and those who agreed were asked to sign the consent form. Interview using the questionnaire was taken and physical verification using checklist was done for vaccine storage, vaccine administration and its management at the site.

Statistical analysis

Statistical analysis was done using Excel spread sheets. Analysis was done in the form of percentages, proportions and represented in four tables. Appropriate tests of significance applied. Final data was analysed quantitatively in terms of frequency/ number and percentages. Mean and standard deviation were calculated for continuous data. Categorical data was analysed using per-centage and chi square test and Fishers exact test. A p-value of <0.05 was considered significant (at 95% confidence interval).

Ethical considerations

We obtained ethical approval from ethics committee LN Medical College and Research centre, Bhopal for this study and informed consent to participate in the study was also obtained from all respondents and there was no conflict of interest.

Table 1: Characteristic of private immunization providers all providers (n=85).

Variables	Categories	n=85 (%)	Mean±SD of quantitative variables.
Age (years)	20 - 40 years	40 (47%)	35.4±3.28
	41 - 60	40 (47%)	47.38±5.54
	61 -80	5 (6.0%)	66.8±7.23
Sex	Male	67 (78.8%)	
	Female	18 (21.2%)	
Religion	Hindu	72 (84.7%)	
	N. Hindu	13 (15.3%)	
Qualification	Diploma in Paediatrics	25 (29.4%)	
	MD in Paediatrics	60 (70.6%)	
Years of experience	0 - 9 year	29(34.1%)	5.76±2.06
	≥10 years	56(65.9%)	19.43±8.65
Training status	Trained	67 (78.8%)	
	Not trained	18(21.2%)	
Type of clinic	Child	67 (78.8%)	
	Mother and child	10 (11.7%)	
	General	8 (9.4%)	
Name of set up	Children hospital	20 (23.5%)	
	Nursing home	14 (16.5%)	
	Private paediatric clinic	42 (49.4%)	
	Other	9 (10.6%)	
Immunization clinic	Registered	70 (82.3%)	
	Not registered	15 (17.6%)	
Clinic is audited	YES	45 (52.9%)	
	NO	40 (48.1%)	

Table 2: Immunization practices of private providers by training and years of experience.

Parameter	Total (n=85)	Level of training			Level of experience		
	N (%)	Trained (N=67) n (%)	Not trained (N=18) n (%)	p- value	0-9y (N=29) n (%)	≥10y (N=56) n (%)	P value
Vaccine administration practices							
Vaccination is done							
Vaccinate Daily	75 (88.24%)	62 (92.54%)	13 (72.22%)		22 (75.86%)	53 (94.64%)	
Vaccinate on weekly basis	1 (1.18%)	1 (1.49 %)	0 (0%)	0.0175	1 (3.45%)	0 (0%)	0.0108
Vaccinate on parent's demand	9 (10.58%)	4 (5.97%)	5 (27.78%)		6 (20.69%)	3 (5.36%)	
Use MMR for MCV1	82 (96.47%)	64 (95.52%)	18 (100%)	0.3607	26 (89.66%)	56 (100%)	0.0142
Routinely vaccinate infants that are mildly ill	33 (38.82%)	27 (38.80%)	6 (33.33%)	0.5903	8 (27.59%)	25 (42.86%)	0.1260
Vary schedule for financial reasons	36 (42.35%)	29 (43.28%)	7 (38.89%)	0.7376	11 (37.93%)	25 (44.64%)	0.5526
Know VVM	83 (97.65%)	65 (97.01%)	18 (100%)	0.4582	29 (100%)	54 (96.43%)	0.3031
Administer 2 or 3 vaccines in the same visit	62 (72.94%)	49 (73.13%)	13 (72.22%)	0.9384	18 (62.07%)	44 (78.57%)	0.9689
Primary reason for not administering2 or 3 vaccines in the same visit (n=23)							
Practitioners own judgement	9 (39.13%)	7 (38.89%)	2 (40%)		3 (27.27%)	6 (50%)	
Parental concerns	12 (52.17%)	9 (50%)	3 (60%)	0.7291	7 (63.64%)	5 (41.67%)	0.5240
Other reason	2 (8.70%)	2 (11.11%)	0 (0%)		1 (9.09%)	1 (8.33%)	
Vaccination schedule used							
National	6 (7.06%)	5 (7.46%)	1 (5.56 %)		5 (17.24%)	1 (1.79%)	
IAP	78 (91.76%)	61 (91.04%)	17 (94.44%)	0.83	24 ((82.76%)	54 (96.42%)	0.0297
Both	1 (1.18%)	1 (1.49 %)	0 (0%)		0 (0%)	1 (1.79%)	
Cold Chain equipment used							
Domestic refrigerator	62 (72.94%)	48 (71.64%)	14 (77.78%)		23 (79.31%)	39 (69.64%)	
ILR	5 (5.88%)	4 (5.97%%)	1 (5.56%)	0.8621	4 (13.79%)	1 (1.79%)	0.0102
Dedicated refrigerator	18 (21.18%)	15 (22.39%)	3 (16.66%)		2 (6.90%)	16 (28.57%)	
Record keeping and reporting							
Practitioner has a record of vaccination	82 (96.47%)	66 (98.50%)	16 (88.89%)	0.04959	28 (96.56%)	54 (96.43%)	0.9767
If YES, then type of record (n=82)							

Continued.

Parameter	Total (n=85)	Level of training			Level of experience		
Office based register	18 (21.95%)	14 (21.21%)	4 (25%)		9 (32.14%)	9 (16.67%)	
Register is used to identify	3 (3.66%)	3 (4.55%)	0 (0%)	0.6661	2 (7.14%)	1 (1.85%)	0.1058
Home based vaccination card	61 (74.39%)	49 (74.24%)	12 (75%)		17 (60.71%)	44 (81.48%)	
Reporting doses to government	28 (32.94%)	26 (38.81)	2 (11.11%)	0.0264	8 (31.03%)	20 (33.93%)	0.4496
Report a case of rash with fever	62 (72.94%)	49 (73.13%)	13 (72.22%)	0.8361	23 (79.31%)	41 (73.21%)	0.5367
Report a case of AFP	82 (96.47%)	64 (95.52%)	18 (100%)	0.3607	28 (96.55%)	54 (96.43%)	0.9767
Cold-chain practices							
Vaccine refrigerator has a visible temperature log	69 (81.18%)	55 (82.09%)	14 (77.78%)	0.6777	26 (89.66%)	43 (76.79%)	0.1501
Vaccine refrigerator has a Thermometer	56 (65.88%)	51 (76.12%)	5 (27.78%)	0.0001	18 (62.07%)	38 (66.07%)	0.5935
At least one vaccine with expired VVM (stage 3 or 4)	13 (15.29%)	9 (13.43%)	4 (22.22%)	0.3577	4 (13.79%)	9 (16.07%)	0.7820
Functional generator is available	64 (75.29%)	53 (79.10%)	11 (61.11%)	0.1160	22 (75.86%)	42 (75%)	0.9303
Injection safety practices							
Auto-disable syringes used for immunization	68 (80%)	51 (76.12%)	17 (94.44%)	0.0844	26 (89.66%)	42 (75%)	0.1092
Hub cutter used for sharps disposal	45 (52.94%)	35 (52.24%)	10 (55.56%)	0.8023	17 (58.62%)	28 (50%)	0.4502
Control measures are kept for AEFI	84 (98.82%)	66 (77.65%)	18 (21.18%)	0.6021	29 (100%)	55 (98.21%)	0.4691

RESULTS

Characteristics of physicians and their practices are described in Table 1. Out of total paediatricians 78.8% were male and 21.2% females. By qualification 29.4% paediatricians were holding Diploma in Child Health (DCH) and 70.6% paediatricians were MD in paediatrics. By level of experience, 34.1% had less than 10-year experience and 65.9% had more than 10 years of experience of vaccination. In our study 78.8% paediatricians were trained and 21.2%were not trained. Maximum of private providers 78.8% were providing vaccination services in child clinics and 11.7% in mother and child and 9.4% were practising immunization in others set up. In our study 82.35% immunization clinics were registered to government sector and 52.9% private settings out of total were regularly audited. Audit of clinics and children hospital where vaccination was provided of those, only 52.9% were done. Immunization practices of private immunization providers by training status and level of experience are described in Table 2 and by audit status in Table 3. Immunization practices were measured on level of training status (trained v/s not trained), level of experience (< 10-year experience v/s ≥10-year experience) and audit status (audited v/s not audited). In immunization practices we assessed vaccination administration practices of private providers. Most practitioners 88.2% were doing vaccination daily. 96.5% were administering MMR vaccine in place of MCV1 vaccine. Most practitioners (61.2%) were unwilling to administer the vaccines to infants who were mildly ill (mild fever, cough and cold and diarrhoea) and only 38% were vaccinating to those who were mildly ill.

Table 3: Immunization practices of private providers overall by audit status.

Parameter	Total (N =85)	Audit status		
	n (%)	Audited (45) n (%)	Not audited (N=40) n (%)	p value
Vaccine administration practices				
Vaccination is done				
Vaccinate daily	75 (88.24%)	40 (88.89 (%)	35 (87.5%)	
Vaccinate on weekly basis	1 (1.18%)	1 (2.22%)	0 (0%)	0.5614
Vaccinate on parent's demand	9 (10.58%)	4 (8.89%)	5 (12.5%)	
Use MMR for MCV1	82 (96.47%)	43 (95.56%)	39 (97.5%)	0.6277
Routinely vaccinate infants that are mildly ill	33 (38.82%)	22 (48.89%)	11 (25%)	0.04342
Vary schedule for financial reasons	36 (42.35%)	21 (46.67%)	15 (37.5%)	0.3932
Know VVM	83 (97.65%)	43 (95.56%)	40 (100%)	0.1772
Administer 2 or 3 vaccines in the same visit	62 (72.94%)	34 (75.56%)	28 (70%)	0.5649
Primary reason for not administering 2 or 3 vaccines in the same visit (n=23)				
Practitioners own judgement	9 (39.13%)	5 (45.45%)	4 (33.33%)	
Parental concerns	12 (52.17%)	5 (45.45%)	7 (58.33%)	0.8180
Other reason	2 (8.70%)	1 (9.09%)	1 (8.33%)	
Vaccination schedule used				
National	6 (7.06%)	4 (8.89%)	2 (5%)	
IAP	78 (91.76%)	41 (91.11%)	37 (92.5%)	0.8161
Both	1 (1.18%)	0 (0%)	1 (2.5%)	
Cold Chain equipment used				
Domestic refrigerator	62 (72.94%)	28 (62.22%)	34 (85%)	
ILR	5 (5.88%)	4 (8.89%)	1 (2.5%)	0.5896
Dedicated refrigerator	18 (21.18%)	13 (28.89%)	5 (12.5%)	
Record keeping and reporting				
Practitioner has a record of vaccination	82 (96.47%)	44 (97.78%)	38 (95%)	0.4884
If YES, then type of record (n=82)				
Office based register	18 (21.95%)	11 (25%)	7 (18.42%)	
Register is used to identify	3 (3.66%)	2 (4.54%)	1 (2.63%)	0.6690
Home based vaccination card	61 (74.39%)	31 (70.45%)	30 (78.95%)	
Reporting doses to government	28 (32.94%)	21 (46.67%)	7 (17.5%)	0.0042
Report a case of rash with fever	62 (72.94%)	33 (73.33%)	29 (72.5%)	0.9312
Report a case of AFP	82 (96.47%)	43 (95.55%)	39 (97.5%)	0.6277
Cold-chain practices				
Vaccine refrigerator has a visible temperature log	69 (81.18%)	41 (91.11%)	28 (70%)	0.01294
Vaccine refrigerator has a Thermometer	56 (65.880%)	36 (77.78%)	20 (50%)	0.0035
At least one vaccine with expired VVM (stage 3 or 4)	13 (15.29%)	10 (22.22%)	3 (7.5%)	0.0597
Functional generator is available	64 (75.29%)	38 (84.44%)	26 (65%)	0.0380
Injection safety practices				
Auto-disable syringes used for immunization	68 (80%)	37 (82.22%)	31 (77.5%)	0.5869
Hub cutter used for sharps disposal	45 (52.94%)	26 (57.78%)	19 (47.5%)	0.3434
Control measures are kept for AEFI	84 (98.82%)	44 (97.78%)	40 (100%)	0.3429

42.3% of practitioners stated that they would vary vaccination schedule "sometimes or often'' for financial reasons because of inability to pay by the parents and 57.6% stated that they would never vary vaccine schedule. Of the total, 97.6% private providers knew about VVM. Most of the practitioners (72.9%) administer 2 or 3 vaccines in the same visit, while 27.1% practitioners were not administering 2 or 3 vaccines in same visit. Out of 27.1% practitioners, 39.1% did not administer because of their own judgement and 52.2% because of parental concerns and 8.7% due to other reason.

A common explanation provided was that con-current administration of 2 or 3 vaccine would lead to increased adverse effects and parents will not come for the next time for vaccination. Majority (91.7%) followed the IAP schedule, 7% followed the National Immunisation

Schedule and only one pediatrician followed both. In this study 73% practitioners stored vaccines in domestic refrigerators; 21% practitioners were storing vaccine in dedicated refrigerator, while only 6% were using ILR for storage of vaccine.

Record keeping and reporting practices were not up to mark. In our study 96.5% of practitioners were keeping the record of vaccination.21.9% private providers were having office based register, 3.7% of practitioners reported using a register to record vaccination doses. 74.4 % reported that they would not vaccinate the child if vaccination card provided by practitioner used for due vaccine was not brought by the parents. A majority 67.1% of practitioner stated that they would not report vaccine doses administered to government, the reason being given not knowing how to report and where to report, few of them gave the reason that previously Govt. agents were collecting the report, then they stopped coming to collect it. In the present study, majority of respondents 72.9% knew the importance of reporting a case of rash with fever and 96.5% would report a case of acute flaccid paralysis, but still not reported it. The most common reason given were not knowing where to report.

Cold chain practices were directly observed that was not satisfactory and suggests weakness in cold chain quality. Visible temperature log was present in 81.2% refrigerator; thermometer was more frequently present in 64.7% refrigerators. Functional generator was present in 75.3% private set up.

Injection safety practices were better in private clinics. Majority 80% of the private provid-ers used auto- disable syringes during vaccination and 52.9% used hub cutter for sharp disposal. Most of them 98.8% were keeping control measures for AEFI (Adverse Event Following Immunization).

DISCUSSION

This study conducted an on-site assessment of immunization practices among private immunization providers. The response rate of our study was 81.7% which is consistent with prior studies among paediatricians.[12,15]

Vaccine administration practices

Regarding vaccination schedule most of the private providers (91.8%) followed the IAP recommended vaccination schedule rather than the regular Universal Immunization Program (UIP) schedule of India. A varied series of vaccines not included in UIP schedule were offered by private providers (including typhoid, varicella, hepatitis A and human papillomavirus vaccine). Similar findings were obtained by Hagan et al, Santos et al. also reported that the private sector is primarily using vaccines that are not included in the EPI schedule and providers determine the price for vaccines procured outside of the government (e.g. hepatitis A and varicella).[12,14]

Among the private providers 88.2% were doing vaccination daily, 10.6% on parent's demand and 1.2% were vaccinating weekly. Practices like not immunizing children who are mildly ill (61.2%), reported among private providers was also found. Misconceptions regarding vaccination in minor illnesses may lead to missed opportunity of vaccination (MOV) and thus contribute to vaccination delay and incomplete vaccinations. In addition, MOV can't be fully addressed without a key change in the attitude of practitioners towards immunization; without a specific valid contra-indication, every child should be vaccinated with all indicated vaccines to reach and maintain high vaccination coverage.[10,30,31]

However, in the present study, (97.6%) can interpret VVM (Vaccine Vial Monitor). Similar finding was reported by S Mallik et al.[17] In the study, conducted by S. Rao et al. about 80.3% of the doctors were aware about the vaccine vial monitor.[26] The vaccine vial monitor registers cumula-tive heat exposures on vaccine over time. The VVM label provides an indication of the integrity of the cold chain, both in routine storage and, and when vaccines are removed from storage for final distribution to vaccination sessions. This low-cost technology is a critical support to promote good temperature management, and provides reassurance of the potency.[29]

Since most (72.9%) of the paediatricians were administering 2 or 3 vaccine in the same visit, only (23.1%) reported hesitancy to administer multiple injection at the same visit because of their own judgement (39.1%) rather than parental concerns (52.2%). This finding of multiple injection hesitancy among practitioners may also lead to MOV.[12,23] Increased parental hesitancy is associated with parents' decision to delay or refuse vaccinations for their child, and that this deci-sion is associated with lower vaccination coverage.[32] Large number of misconceptions still prevails not only among the health professional but even among general population which often lead to non- completion of vaccination schedule. These are mild cold, cough, diarrhoea, prematurity, breast findings, history of seizures, family history of adverse reactions to vaccine, static neurological diseases.[27]

Record keeping and reporting

In this study we found 96.5% were recordkeeping, out of them 75.6% had home based vaccine card and 20.7% had office-based record. Hagan et al. suggests that MOV could also be reduced through the improved and increase use of office-based records and child-based vaccination registers, instead of relying solely on home-based vaccination cards.[12]

We found low reporting of vaccination doses. Only 32.9% were reporting vaccination doses and 67.1% did not report. Hagan et al. found that 22% of private providers stated that they reported doses administered to the government; 69% did not report. Patel et al. assessment in the Philippines found that 36% of private hospitals reported vaccination coverage to the government immunization program compared to 96% of government clinics.[24] However, some respondents reported reluctance to report doses to the government out of concern for tax implications due to increased government attention to service volume.[12] In our study we found 74.1% were reporting a case of rash with fever and 96.5% stated that they would report a case of AFP. AEFI (Acute Flaccid Paralysis) (Adverse Event Following Immunization) reported to be similar to findings of Hagan et al. and Patel et al.[12,24] In India, the government provides limited monitoring and supervision at the field level for private practitioners. Assessment teams who conducted visits to private practitioners providing hepatitis B vaccines noted that reporting of doses administered from the private sector were fragmented and sporadic.[25]

Cold chain practices

The findings of this study show that cold chain practices were inadequate and cold chain monitor-ing was not effective. This study showed that in 72.9% of practices, vaccines were stored in domes-tic refrigerators and only 21.2% in dedicated refrigerator and 5.9% in ILR. This shows that private practitioners do not have good understanding about potential harm if vaccines are kept in none dedicated refrigerator. This study is consistent with study done by Hagan et al., Bell et al. and Lilian Yuan et al.[12,19,22]

In our study 34.1% of the private practices lack thermometer, although 81.2% had visible temperature log in their refrigerator. Hagan et al. found that only 26% paediatricians had thermometer in the vaccine refrigerator.[12] Similar findings have been reported by Lewis et al and Grasso et al, Bell et al have reported that lack of thermometer and failure to maintain temperature ranges in the refrigerator are a major risk factor for failure of potency of vaccines.[20-22] None of the private sector hospitals maintained a thermometer and required temperature ranges in the freezer. These findings are similar to those reported by Pai et al. from China. This brings out the fact that in developing countries cold chain maintenance practices among the private practitioners/hospitals is not safe and the risk of failure of vaccine potency is high.[28] In our study expired (stage 3-4) VVMs were noted in 15.3% of refrigerator which is consistent with similar findings 16% that was noted by Hagan et al.[12]

The present study did not observe any shortage of back-up generator. Back-up generator services was available in 75.3%. Back-up generator services was available in 20% of the centres in Kolkata city observed by Mallik et al. and 17% of the refrigerators had a permanent electrical hook-up in the Grand Valley of Colorado, ensuring against accidental disconnection and compromise of cold chain as reported by Woodyard et al.[17,18] The Government of India (GOI) protocol rec-ommended that each vaccine storage and distribution facility with electrically operated refrigera-tion equipment has a power generator to secure a reliable source of electricity.

Injection safety practices

Vaccine administration techniques were better in private clinics. Most of the private providers i.e. 80% were using auto-disable syringes for vaccination and half of them 52.9% used hub cutters for sharp disposal. Aseptic precautions were followed at the time of vaccine administration, 98.8% were keeping control measures for AEFI. Injection safety practices were also better in the study done by Hagan et al. and Kumar et al.[12,16]

CONCLUSION

In current scenario of the country, regular periodic audits and ongoing training sessions are drastically required to achieve goals of universal immunisation program coverage in private sector. Although knowledge on immunization practices among private providers was good, it needs improvement in cold storage practices, recordkeeping and reporting practices. Quality of immunization services in private sector can be strengthened by providing training and support to private immunization service providers. As sample size of this study was relatively less, so only few p values have shown significant results for various parameters.

Recommendations

Monitoring and supervision of private immunization providers would increase the immunization coverage. Public-private partnership strengthening is needed to improve vaccination and also for newer research in vaccines, that should be shared with public system. Private practitioners should adhere to rules and regular training is recommended for maintenance of cold chain to maintain potency of vaccines. Periodic audits should be done by Government authority for system upgradation with current status of immunization practices and equipment's. It is obligatory to administrate such operational researches with large sample size at different geographical habitations to do a sensible SWOT (Strength, Weakness, Opportunities and Threats)analysis about the existing lacunae.

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REFERENCES

1. World Health Organization. Global vaccine action plan. Vaccine. 2011:1-147.
2. Meeting of the strategic advisory group of experts on immunization. Conclusions and recommendations. Weekly Epidemiological Record. 2016;21;266-84.
3. WHO. Module 2: The Vaccine Cold Chain. Accessible at http://apps.who.int/immunization-standards/vaccine-quality/pqs-catalogue/. Accessed on 12 August 2020.
4. Centres for Disease Control (CDC) General Recommendations on Immunization Recommendation of Advisory Committee on Immunization Practices. Available at http://www.cdc.gov/mmwr/cme/conted.htm. Accessed on 20 September 2020.
5. WHO Guidance Note: Engagement of private providers in immunization service delivery. Considerations of National Immunization Programmes, Oct 2017.
6. GOI and UNICEF (Government of India and United Nations Children's Fund). 2009 Coverage Evaluation Survey - All India Report; 2010. Accessed on http://files.givewell. org/files/DWDA 2009/GAIN/UNICEF India Coverage Evaluation% 0A Survey (2009).pdf%0A. Accessed on 20 September 2020.
7. Levin A, Kaddar M. Role of the private sector in the provision of immunization services in low and middle-income countries. Health Policy Plan. 2011;26(1):4-12.
8. Sharma S, Sagar KS. Delivering the immunisation promise in India a snapshot. Vaccines Practice. 2012;5(2):87-95.
9. Casey RM, Dumolard I, Holiday MC, Dobo GM, Diallo MS, Hampton LM, et al. Global routine vaccination coverage. Morb Mortal Wkly Rep. 2016;65:1270-3.
10. Sridhar S, Maleq N, Guillermet E, Colombini A, Gessner BD. A systematic literature review of missed opportunities for immunization in low- and middle- income countries. Vaccine. 2014;32;6870-9.
11. Mitrovich R, Martti M, Watkins M, Duclos P. A review of the private sectors contribution to immunization service delivery in low, middle, and high-income countries. SAGE. 2017;8:45-9.
12. Hagan J, Gaonkar N, Doshi V, Patni A, Vyas S, Mazumdar V, et al. Knowledge, attitude and practices of private sector immunization service providersin Gujarat, India. Vaccine. 2018;36:36-42.
13. Sharma A, Kaplan WA, Chokshi M, Zodpey SP. Role of the private sector in vaccination service delivery in India: evidence from private-sector vaccine sales data, 2009-12. Health Policy Plan. 2016;31(7):884-96.
14. Santos, Jose Ignacio, Professor, School of Medicine, National Autonomous University of Mexico M. Personal Communication. 2016. Available at https://www.kgi.edu/people/jose-ignacio-santos/. Accessed on 12 September.
15. Azria A, Noorhayati MN, Norwati D. Knowledge, attitude and adherence to cold chain among general practitioners in Kelantan, Malaysia. Int J Collaborative Res. 2013;5(3):157-67.
16. Kumar HN, Aggarwal A. Cold chain maintenance and vaccine administration practices in hospitals and clinics of Mangalore city a health system research. National J Comm Med. 2013;4(2):231-5.
17. Mallik S, Mandal PK, Chatterjee C, Ghosh P, Manna N, Chakrabarty D, et al. Assessing cold chain status in a metro city of India: an intervention study. African Health Sci. 2011;11(1):128-33.
18. Woodyard E, Woodyard L, William A. Alto. Vaccine Storage in The Physician's Office: A Community Study. J Am Board Fam Pract. 1995;8(2):91-4.
19. Yuan L, Daniels S, Naus M, Bricic B. Vaccine storage and handling: knowledge and practice in primary care physician's offices. Canadian Family Phy. 1995;41:1169-76.
20. Grasso M, Ripabeli G, Saammarco ML, Manfredi TM, Selvaggi A. Quaranta vaccine storage in the community: a study in central Italy. Bull World Health Organ. 1999;77.
21. Lewis PR, Reimer RF, Dixon AJ. Evaluating the efficacy of vaccine storage in the general practice setting. Aust NZJ Public Health. 2001;25(6):547-50.
22. Bell KN, Hogue CJ, Manning C, Kendal AP. Risk factors for improper vaccine storage and handling in private provider offices. Official J Am Academy Pediat. 2001;107(6):E100.
23. Soeung SC, Grundy J, Morn C, Samnang C. Evaluation of immunization knowledge, practices and service delivery in the private sector in Cambodia. J Health Popul Nutr. 2008;26(1):95-104.
24. Patel MK, Capeding RZ, Ducusin JU, Castro M, Garcia LC, Hennessey K. Findings from a hepatitis B birth dose assessment in health facilities in the Philippines: opportunities to engage the private sector. Vaccine. 2014;32:5140-4.
25. Lahariya C, Subramanya BP, Sosler S. An assessment of hepatitis B vaccine introduction inIndia: Lessons for roll out and scale up of new vaccines in immunization programs. Indian J Public Health. 2013;57(1):8-14.
26. Rao S, Naftar S, Baliga, Unnikrishnana B. Evaluation, awareness, practice and management of cold chain at the primary health care centers in coastal South. India J Nepal Paediatr. 2012;32(1):56-9.
27. Seth V. In: Immunization in Practice. Eds Mittal SK, Kukreja S. 2nd edition. Delhi, CBS Publishers and Distributors;1991:38.

28. Pai HH, Ko YC. Vaccine storage practices in primary care physicians' offices in Taiwan. Kaohsiung J Med Sci. 1999;15(5):274-9.
29. Krishnan SG, Sondi S, Singh A, Amir LE, Ibrahim MY. Vaccine storage in private practice: a community trial. J Family Med Community Health. 2014;1(2):10-1.
30. Sinha AK, Verma AR, Chandrakar A, Khes SP, Panda PS, Dixit S. Evaluation of cold chain and logistics management practice in Durg district of Chhattisgarh: pointer from Central India. Int J Comm Med Public Health. 2017;4(2):390-5.
31. Kolasa MS, Petersen TJ, Brink EW, Bulim ID, Stevenson JM, Rodewald LE. Impact of multiple injections on immunization rates among vulnerable children. Am J Prev Med. 2001;21(4)261-6.
32. Smith PJ, Humiston SG, Marcuse EK, Zhao Z, Dorell CG, Howes C, Hibbs B. Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the health belief. Model Public Health Reports. 2011;2:126.

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