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Title:

Physicians' practices related to disease surveillance activities under the Integrated Disease Surveillance Program (IDSP) in Bihar.

Abstract

Background: Physicians are the key implementer of the Integrated Disease Surveillance Programme (IDSP) in India. The specific role and responsibilities include presumptive surveillance of notifiable diseases, outbreak investigation and laboratory diagnostic, if necessary. Physicians are also in charge of overseeing the syndromic surveillance undertaken by Auxiliary Nurse Midwives. Being a key member of the Rapid Response Teams in the IDSP, Medical Officers are usually the first to be informed about any outbreak, undertake investigations and initiate response. Compared with other disease-specific programs, little is known about the functioning of the IDSP in Bihar and as physicians are at the core of the IDSP, it is pertinent that their practices related to surveillance activities and outbreak investigation be assessed.

Methods: This was a cross-sectional study conducted between January and April 2019 to assess the practices of physicians (attached to public health facilities) reporting to the IDSP in Bihar. In total, 253 consenting physicians from all 92 public health facilities in Begusarai, Darbhanga and Bhojpur districts in Bihar, who were involved with IDSP reporting, were interviewed. Data were collected on general characteristics, practices related to case detection using standard case definition, case registration, data reporting, database management, analysis, outbreak preparedness, outbreak response including prevention and control measures, training and supervision through an offline-online synchronized data collection application. All descriptive and regression analyses were performed using SAS version 9.4.

Results: The mean age of the physicians was 46 years and were involved with IDSP for 5 years on an average. A significant number of medical officers were practitioners of the Indian system of medicine (AYUSH) and most were under contractual engagement. Practices related to IDSP-related core functions among the majority of the participants appeared poor. Preparedness to undertake control measures during an outbreak was also inadequate. A large number of the physicians had not received any formal training on IDSP. Physicians holding a MBBS degree and those with better overall IDSP-specific knowledge had a better likelihood of correctly conducting presumptive surveillance.

Better system-level readiness also increased the probability of providing provisional diagnosis. Better overall IDSP-specific knowledge, system-level readiness and receiving formal training on IDSP resulted in higher odds of having good overall practices among the medial officers. Supportive supervision, provision of feedback, real time communication and data analysis were irregular and inadequate.

Conclusion: Surveillance and outbreak-related practices were poor among the physicians engaged with IDSP in Bihar. Major gaps in communicable disease surveillance activities, operational logistics, outbreak detection and response capacity were identified in all the three studied districts. IDSP-related training among physicians seemed inadequate. Regular training, orientation, particularly of AYUSH doctors and simplified method of reporting are likely to improve surveillance and outbreak-linked performances of the physicians reporting under IDSP in Bihar.

Keywords: Physician, Surveillance, Practices, IDSP, Bihar, India

Introduction

India is currently experiencing a dual disease burden of infectious diseases and chronic lifestyle diseases. (1, 2) This presents a unique challenge to India's already overwhelmed fragile public health system. Given the current scenario, prevention of disease occurrence through early detection and appropriate intervention appears to be the most cost-effective approach.(3, 4) Although recent attention has shifted towards the increasing burden of non-communicable diseases and injuries, the risk of communicable diseases is a growing public health concern in almost every state of the country, particularly the underdeveloped states.(5-7) The devastating economic loss and negative health impact as a result of infectious diseases can be prevented or at least reduced largely by early detection through a proper surveillance mechanism. As per the World Health Organization (WHO) recommendations, a robust real-time disease surveillance on epidemic-prone diseases and early warning signs of impending outbreaks are crucial for disease prevention and control in resource-limited settings. (8)

Given that a well-functioning disease surveillance system is instrumental for priority setting and informed decision-making, attention should be given to strengthening the ongoing activities under various disease-control programs. Furthermore, an effective surveillance system should ensure incorporation of information at all levels including suspected cases through syndromic surveillance in the communities, probable cases by presumptive surveillance at the facilities and confirmed cases following laboratory surveillance.(9) Although the surveillance of infectious diseases under several vertical programs has been in place for a long time, the progress has been slow till date.(10, 11) These vertical programs although appeared successful in the initial stages, but due to the non-flexible nature and with minimum horizontal integration, these programs are becoming difficult to sustain over the long term.(1) To address this gap, an integrated approach to disease surveillance was launched by the World Health Organization (WHO) in 1998 to combat the threat of communicable diseases due to emerging and re-emerging diseases.(12)

India also adapted a nationwide surveillance system, the Integrated Disease Surveillance Program (IDSP) in 2004 with financial support from the World Bank. The primary objectives were to detect the threat of communicable diseases and outbreaks and to monitor progress towards disease control.(13) The current IDSP functions at three levels - Central Surveillance Unit (CSU) at the National Center for Disease Control (NCDC, Delhi),

State Surveillance Units (SSU) in every state, and District Surveillance Units (DSU) in all districts of the state.(13) Under the DSUs, weekly data on communicable diseases and outbreak response are captured and uploaded at the IDSP portal.

The medical officers play a very critical role in the IDSP. They are responsible for presumptive disease notification and recommendation of laboratory examination of suspected cases. They are also responsible for quality control during laboratory tests and analysing the results. The physicians in the public health system of the state are also responsible for the supervision of the Auxiliary Nurse Midwives (ANMs) reporting syndromic or symptom positive cases.(14)They are usually the main investigator of any outbreak, being a key member of the Rapid Response Teams (RRT).(15, 16) This excessive dependence on the physicians for disease surveillance is also a bane in a country such as India which does not meet the recommended standards for the number of doctors per 1000 population.(17, 18)Most doctors are concentrated in urban areas, catering to only 20% of the India's population.(19) Another point of concern is the high rate of absenteeism especially among doctors posted to rural areas.(20) This seriously hampers the service delivery in the rural areas. To address the shortage of health care professionals and to strengthen the health care service delivery system, doctors trained in Indian systems of medicine, AYUSH (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) are also incorporated into government health facilities and sometimes are the only ones delivering healthcare to the poor.

Despite the fact that IDSP is in place for over a decade, the engagement of physicians in disease surveillance has been limited. Though the underlying reasons might be multi factorial, the published literature on this issue is limited. In addition, although the international standards recommend evaluation of the surveillance programmes, the systematic review of IDSP has been limited in the country, especially from the eastern part of the country. This poses a serious impediment to measuring and monitoring the progress of the program. Thus, a comprehensive assessment of the practices among physicians reporting to IDSP would help to develop important insights regarding the physicians' role and responsibilities during routine surveillance and outbreak response. Identified gaps and recommended policy based on study findings would ensure better and reliable disease surveillance, predicting trend, risk factor mapping, epidemic preparedness and quick response to outbreak in the future.

Methods

Study area : The study was conducted in Bihar, a landlocked state in the eastern India. It shares an international boundary with Nepal and is surrounded by the Indian states of West Bengal, Uttar Pradesh and Jharkhand.

Study design : Cross-sectional

Study duration: January and April 2019

Study population: At first, the completeness and timeliness of weekly IDSP reporting for the last one year (July 2017 to June 2018; total 52 weeks) were evaluated for all the 38 districts in Bihar. The individual districts were scored and categorised into good, average and poor performing, based on WHO/CDC/Government of Bihar (GoB) cut-offs. A reporting percentage of 80 and above placed the district among the good performers, those between 60 and 80 percent as average performing while reporting below 60 percent was considered as poor performing. The weekly scores were summed to arrive at the Infectious Diseases Surveillance Quality Index (IDSQI) score (maximum-156, minimum-52) and re-scaled within 100. Finally, after testing for normality followed by log transformation, the districts were classified as good/average/poor based on their tertile distribution. 14 of the 38 districts fell under the lowest tertile and were categorised as poor performing, while 12 each were categorised as average and good performing districts. From each stratum, one district was selected randomly for the study (Begusarai (Good performing), Darbhanga (Average performing), Bhojpur (Poor performing)).

All 92 health facilities (Primary Health Care Centre=45, Urban Primary Health Centre=1, Additional Primary Health Centre=34, Community Health Centre=3, Sub-divisional Hospital=2, District Hospitals=2, Referral hospitals=5) that report P-forms to the IDSP in 46 blocks of the three selected districts were selected. In all, 253 (Begusarai=63, Darbhanga=90, Bhojpur=100) consenting physicians who were present at the corresponding health facility and involved with IDSP reporting were included.

Data collection and analysis: Data was collected through interviewer-administered online-offline synchronized mobile application. Quantitative methods were employed to gain some insights into the practices related to the surveillance for reportable diseases among physicians in the public health system in Bihar. Data were collected on case detection using standard case definition for communicable diseases under IDSP, general practice of case registration, practice of prescribed data reporting, database management, analysis, outbreak preparedness and response, outbreak prevention and control

measures, training and supervision. IDSP-related practices were assessed and categorized based on tertile distribution of overall practice score of each sub-domain (correct response=1, incorrect response=0) and as a whole into good (uppermost tertile), average and poor (lowest tertile). System readiness was assessed based on observations at the selected health facilities.

Data analysis was done with SAS software version 9.4. All the numerical (continuous) variables were expressed as mean and 95% confidence interval (CI). Frequency, percentage distribution and 95% CI were done for the categorical variables. Bivariate analyses were conducted to investigate associations between physicians' practice regarding IDSP, correctly filling the P-Form and the independent variables: doctors' age, type of medical training (degree), system preparedness, knowledge and IDSP-related training. Multivariable logistic regression was also performed to determine the associations between the outcome variables of practice related to IDSP and the above-mentioned independent variables adjusting for possible confounders. The significance level was fixed at 5%.

Results

A total of 253 physicians were included in the study. The mean age of the physicians was 45.77 (95%CI 44.38-47.16) years with a mean job duration of 5 years (60.81 months (95%CI 51.03-70.58)) in the IDSP. Though majority of the physicians had an allopathic background (N=161, 57.71% (95%CI 63.64 (57.67-69.60)), a significant number of the respondents practiced Indian system of medicine (73, 28.85 (23.23-34.47)). The distribution of allopathic to non-allopathic doctors differed across the districts, with Bhojpur having the highest proportion of MBBS-degree holders (80% (95%CI 72.02-87.98)). The respondents were mostly from Bihar (99.21% (95%CI 98.11-100.0)) and were contractual employees (54.94 % (95%CI 48.77-61.11)). The majority of the physicians in Begusarai (71.43% (59.96-82.90)) were contractual. The physicians were mostly posted at the Primary Health Centre (N=156, 61.66% (95%CI 55.63-67.69)) and the rest at Additional Primary Health Centre (42, 16.60(11.98-21.22)), Community Health Centre (11, 4.35(1.82- 6.88)) and Urban Hospital (1, 0.40(0.00- 1.17). It took on average 18.32 (95%CI 16.69-19.95) minutes for the physicians to reach their work place and most availed personal transport (62.45% (95%CI 56.44-68.46)). [Figure 1 and Table 1]

Almost all of the (98.41% (95%CI 95.24-100.0)) physicians in Begusarai reported a practice of putting provisional diagnosis in case registration, which was not observed in Darbhanga (30.00 (20.35-39.65)) and Bhojpur 36.00 (26.43-45.57). Out-patient registers

were well maintained (97.63 (95.74-99.52)) in all the three districts, but maintenance of in-patient register was improper in Darbhanga (38.89 (28.62-49.16)). Overall, the practices of case detection using standard case definition of diseases under IDSP were limited in Darbhanga (74.44 (65.26-83.63)) and Bhojpur (42.00 (32.16-51.84)). [Table 2]

A large number of clinicians in Darbhanga (78.89% (95%CI 70.29-87.48)) and Bhojpur (70.00 (60.86-79.14)) did not undertake any analysis of the reported epidemiological data ever. Regarding outbreak readiness, the Rapid Response Teams (RRT) were mostly present in all three districts (76.04(69.95-82.13)). In all the three districts, documents pertaining to verification of an outbreak were unavailable (85.62(80.00-91.24)). Similarly, emergency fund for outbreak management was mostly inaccessible in Begusarai (88.89 (80.91-96.87) and Darbhanga (71.11 (61.56-80.66)). In case of outbreak, availability of appropriate supplies and allowance for vehicle use were insufficient in 30.00% (95%CI 20.35-39.65) and 36.67% (26.52-46.82) of the Health Centers/Hospitals, respectively, in Darbhanga. In contrast, all the districts had access to emergency stocks (79.84(74.86-84.82)) though overall outbreak preparedness was poor in 33.33% (95%CI 21.37-45.30) of the surveillance units in Begusarai and 63.33% (53.18-73.48) in Darbhanga. About 82.54% (72.90-92.18) physicians in Begusarai and 58.89% (48.53-69.25) in Darbhanga were not aware of their outbreak coordinator in the district. In the three districts, 87.75% (83.68-91.81) of the clinicians could not mention the number of outbreaks reported over 6 months, while only 36.36 % (30.40-42.33) had themselves undertaken any outbreak investigation during their tenure. Among those who had undertaken an outbreak investigation in Darbhanga recounted that it took more than 48 hours to get a response following the submission of an outbreak report. [Table 3, Figure 2]

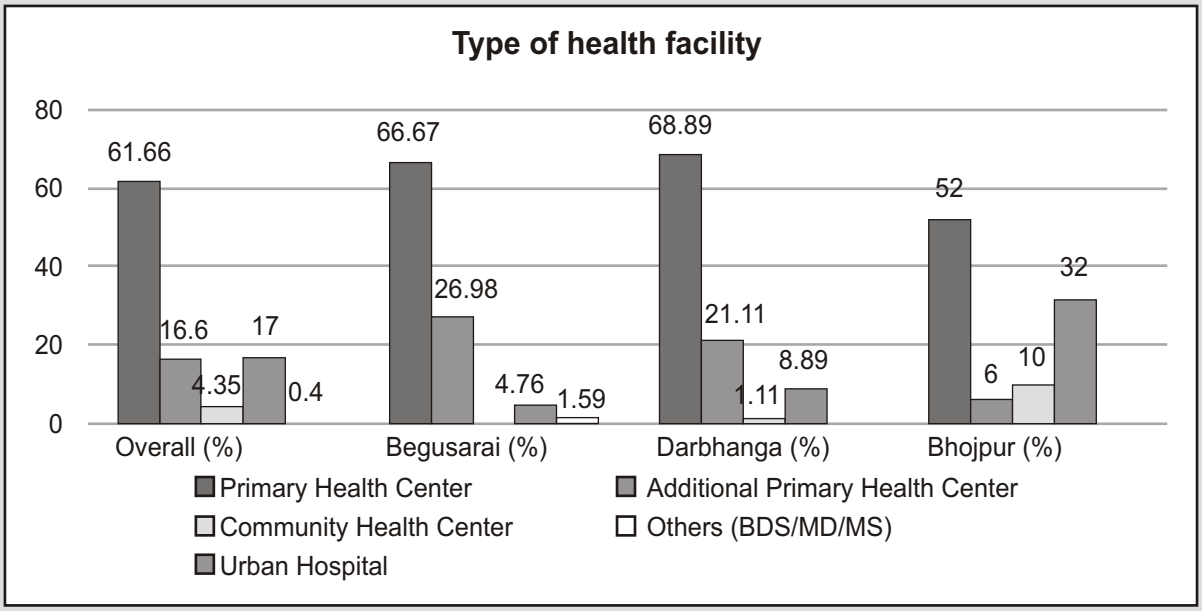
Altogether 149 (58.89(52.79-65.00)) medical officers had undertaken exploration of risk factors during an outbreak in the three districts. Of the 19 physicians in Darbhanga who had undertaken control measures following an outbreak, 11 reported prevention and control measure with respect to water purification was not undertaken. Similarly, 54.35 % (95%CI 39.39-69.30) and 84.21% (66.15-100.0) of the physicians in Darbhanga and Bhojpur stated that container surveys were given a miss, respectively. Awareness campaigns, keeping stock of medication, commencement of mass chemoprophylaxis were the most common interventions deployed for outbreak preparedness in the districts, with the exception of Darbhanga. Overall, control measures adopted during an outbreak was inadequate among 67.39% (53.32-81.47) of the physicians in Begusarai, 94.74% (83.68-100.0) in Darbhanga and 41.67% (30.90-52.43) in Bhojpur. [Table 4]

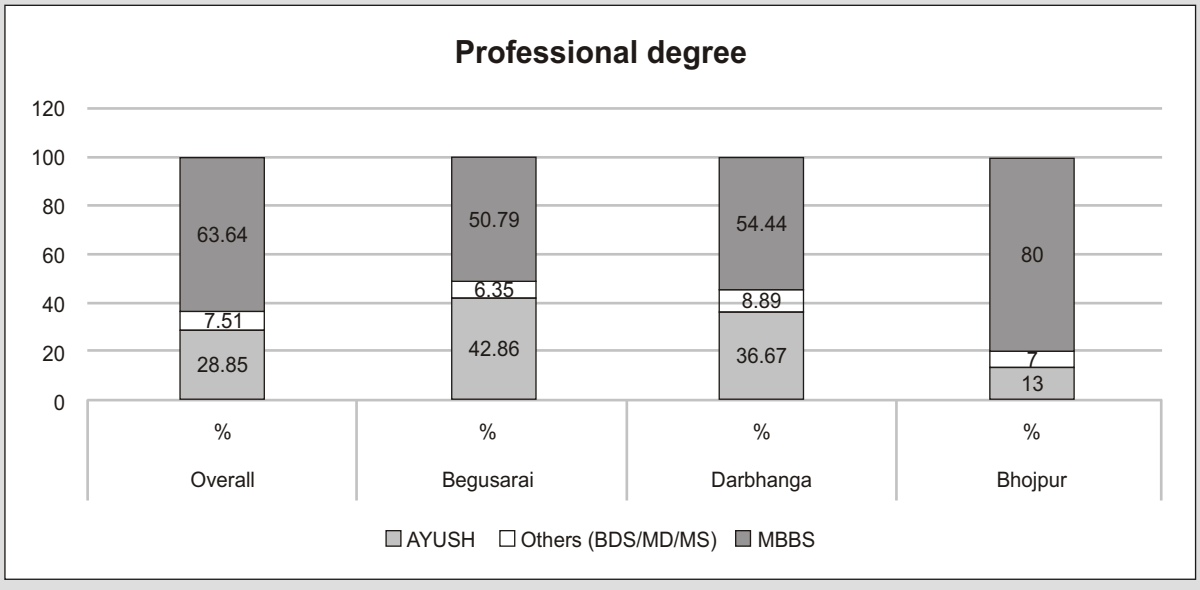
In Bhojpur, 94.00% (89.26-98.74) of the physicians had not receive any formal training on IDSP. The figures were slightly less in Darbhanga, 76.67% (67.76-85.57) and in Begusarai 55.56% (42.94-68.17). Supervision duties were given a miss by 69.57% (63.86-75.27) of the clinicians and only 17.00% (12.34-21.66) reported themselves being supervised by the DSU. The majority reported that regular feedback from the district unit was not given (64.43% (95%CI 58.49-70.37)). According to the medical officers in Darbhanga (83.33% (95%CI 75.48-91.18)) and Bhojpur (81.00 (73.18-88.82)), organization of workshop/s and training were mostly overlooked by the district team most of the time, but in case a workshop was held, majority were satisfied with the content (80.95(72.38-89.53)). [Table 5]

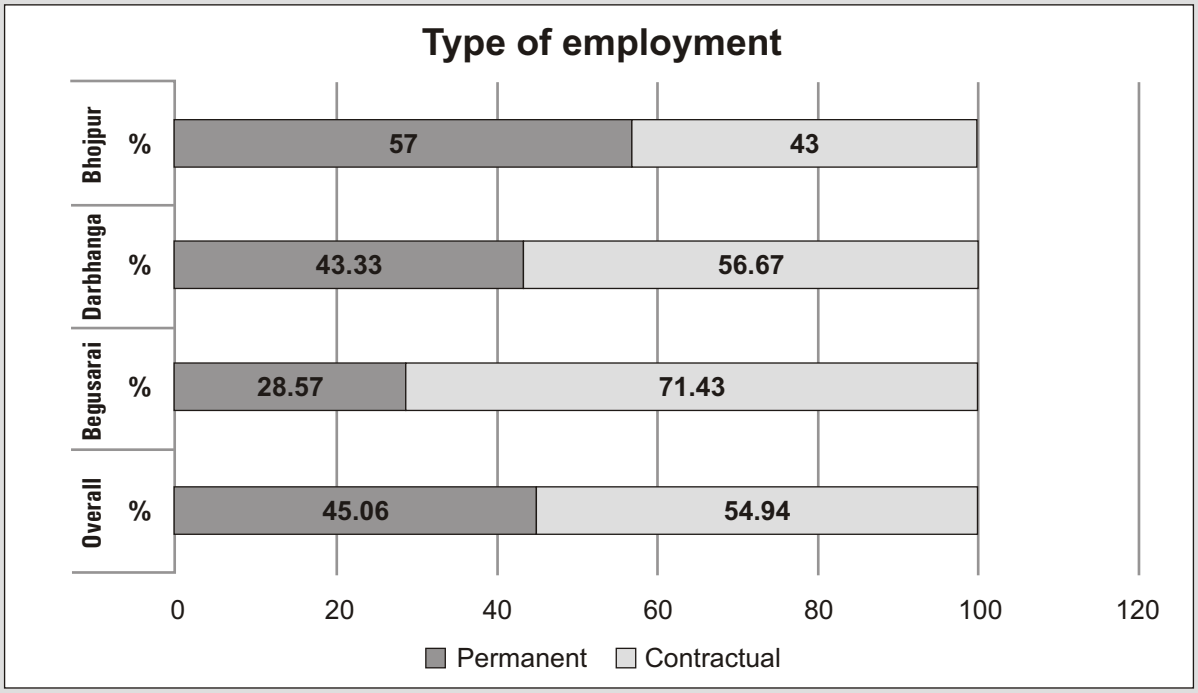
Though OPD (Outpatient Department) register was present in almost all facilities, it was correctly filled by few. Similarly, IPD (Inpatient Department) register was found to be correctly filled by 70 participants. Furthermore, disease summary was mostly absent for both OPD (Begusarai= 47.62% (95%CI 34.94-60.30), Darbhanga= 97.78 (95%CI 94.67-100.0), Bhojpur= 83.00 (95%CI 75.51-90.49)) and IPD (Begusarai= 26.98 (15.72-38.25), Darbhanga= 98.89 (96.68-100.0), Bhojpur= 90.00 (84.02-95.98)) registers of the health facilities in the districts. Standard case definition was not displayed in 80 of the 92 health facilities (OPDs) of the Darbhanga district, while trigger levels were not displayed in 98.42% (95%CI 96.87-99.97) of the health facilities in all the studied districts. Nearly all the reporting health units in the three studied districts did not maintain a rumour register (99.60% (95%CI 98.83-100.0)), did not correctly fill the EWS (Early Warning System) form (99.60(98.83-100.0)) and did not have a training manual for MO (98.42(96.87-99.97)). In almost all the health facilities of Begusarai, IDSP P-Forms were incorrectly filled and lacked a functional desktop/laptop. Similarly, most of the reporting health units failed to correctly fill the P-Form in Darbhanga and majority of the health units did not have a functional desktop/laptop. On the whole, Health units in Darbhanga had the least favourable performance when it came to reporting to the IDSP (Poor= 88.89% (95% CI 82.27-95.51)). [Figure 3a, 3b]

Allopathic physicians (AOR=4.86, (95%CI 2.02-11.68), p-value=0.0004) and physicians with better overall IDSP-related knowledge ($AOR_{Average}$ 4.98(2.37-10.44) <.0001 and AOR_{Good} 2.32 (1.02- 5.28) 0.0456; Reference=Poor knowledge) were more likely to correctly fill the prescribed reporting format, P-Form. System readiness increased the chance of correctly filling in the P-Forms (2.73(1.46- 5.12) 0.0017). Appropriate System-level readiness led to higher probability of writing provisional diagnosis (5.78 (3.17-10.54) <.0001). Finally,

better overall IDSP-knowledge ($AOR_{Average}$ 10.06(3.46-29.23) <.0001 and AOR Good 53.64(16.61-173.2), <.0001; Reference=Poor knowledge), system-level readiness ($AOR_{Average}$ 4 12.00(4.74-30.43), <.000 and AOR_{Good} 94.95(25.44-354.3) <.0001; Reference=Poor readiness) and receiving formal training on IDSP ($AOR_{Average}$ 2.36(1.06- 5.24) 0.0358 and AOR_{Good} 3.75(1.63- 8.61) 0.0018; Reference=Poor Practice) were associated with better odds of having good overall practices. [Tables 6, 7, 8]







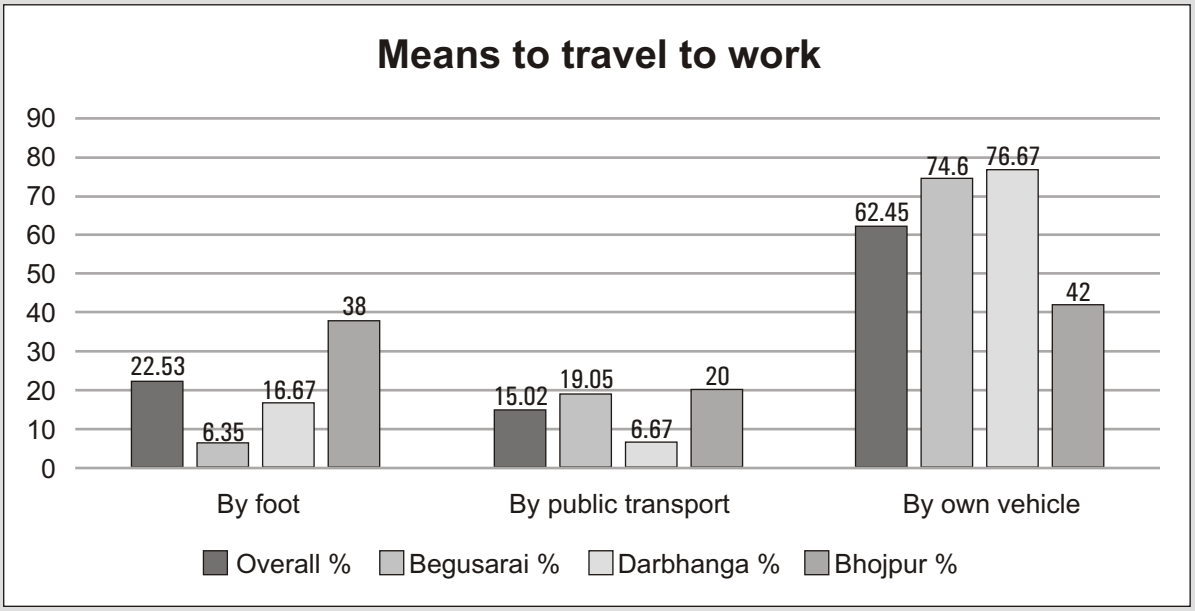


Figure 1: General information of the responding physicians in the three studied districts of Bihar, 2019 (N=253)

Table 1 : General information of the responding physicians in the three studied districts of Bihar, 2019 (N=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		N	Mean (95% CI)	N	Mean (95% CI)	N	Mean (95% CI)	N	Mean (95% CI)
Job duration as Physician in IDSP (in months)	–	253	60.81(51.03-70.58)	63	56.08(48.92-63.24)	90	53.29(40.25-66.33)	100	70.55(49.08-92.02)
Age of the respondent	–	253	45.77(44.38-47.16)	63	46.24(43.36-49.12)	90	46.09(43.67-48.51)	100	45.19(43.03-47.35)
Time taken to reach work place (in min)	–	253	18.32(16.69-19.95)	63	23.48(20.27-26.69)	90	17.72(14.74-20.70)	100	15.61-13.34-17.88)
Indicator	**Category**	**Overall**		**Begusarai**		**Darbhanga**		**Bhojpur**	
		Frequency	**% (95% CI)**	**Frequency**	**% (95% CI)**	**Frequency**	**% (95% CI)**	**Frequency**	**% (95% CI)**
Original residence	Bihar	251	99.21(98.11-100.0)	63	100.0 (100.0-100.0)	90	100.0 (100.0-100.0)	98	98.00 (95.21-100.0)
	Outside Bihar	2	0.79(0.00- 1.89)	–	–	–	–	2	2.00 (0.00-4.79)
Means to travel to work	By foot	57	22.53(17.35-27.71)	4	6.35 (0.16-12.54)	15	16.67 (8.82-24.52)	38	38.00 (28.32-47.68)
	By public transport	38	15.02(10.59-19.45)	12	19.05 (9.08-29.02)	6	6.67 (1.41-11.92)	20	20.00 (12.02-27.98)
	By own vehicle	158	62.45(56.44-68.46)	47	74.60 (63.55-85.65)	69	76.67 (67.76-85.57)	42	42.00 (32.16-51.84)

Table 2 : Physicians' practice of case detection and using standard case definition of diseases under IDSP in the three studied districts of Bihar, 2019 (n=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	Mean (95% CI)	Frequency	Mean (95% CI)	Frequency	Mean (95% CI)	Frequency	Mean (95% CI)
Use of standard case definition while reporting	Not at all	23	9.09(5.52-12.66)	–	–	10	11.11 (4.49-17.73)	13	13.00 (6.29-19.71)
	Yes, sometimes	44	17.39(12.69-22.09)	4	6.35 (0.16-12.54)	8	8.89 (2.90-14.88)	32	32.00 (22.70-41.30)
	Yes, always	186	73.52(68.04-78.99)	59	93.65 (87.46-99.84)	72	80.00 (71.58-88.42)	55	55.00 (45.08-64.92)
Practice of putting provisional diagnosis	No	93	36.76(30.78-42.74)			53	58.89 (48.53-69.25)	40	40.00 (30.23-49.77)
	Yes, sometimes	35	13.83(9.55-18.12)	1	1.59 (0.00-4.76)	10	11.11 (4.49-17.73)	24	24.00 (15.48-32.52)
	Yes, always	125	49.41(43.20-55.61)	62	98.41 (95.24-100.0)	27	30.00 (20.35-39.65)	36	36.00 (26.43-45.57)
Maintenance of out-patient register	No	-	-	-	-	-	-	-	-
	Yes, sometimes	6	2.37(0.48-4.26)	-	-	-	-	6	6.00 (1.26-10.74)
	Yes, always	247	97.63(95.74-99.52)	63	100.0 (100.0-100.0)	90	100.0 (100.0-100.0)	94	94.00 (89.26-98.74)
Maintenance of in-patient register	No	77	30.43(24.73-36.14)	17	26.98 (15.72-38.25)	42	46.67 (36.16-57.17)	18	18.00 (10.34-25.66)
	Yes, sometimes	26	10.28(6.51-14.04)	1	1.59 (0.00-4.76)	13	14.44 (7.04-21.85)	12	12.00 (5.52-18.48)
	Yes, always	150	59.29(53.19-65.38)	45	71.43 (59.96-82.90)	35	38.89 (28.62-49.16)	70	70.00 (60.86-79.1
Record keeping of patients complaining more than two symptoms	No definite standard followed	61	24.11(18.80-29.42)	4	6.35 (0.16-12.54)	40	44.44 (33.98-54.91)	17	17.00 (9.51-24.49)
	Report those with epidemic potential	44	17.39(12.69-22.09)	8	12.70 (4.25-21.15)	13	14.44 (7.04-21.85)	23	23.00 (14.61-31.39)
	Report all	148	58.50(52.39-64.61)	51	80.95 (70.98-90.92)	37	41.11 (30.75-51.47)	60	60.00 (50.23-69.77)

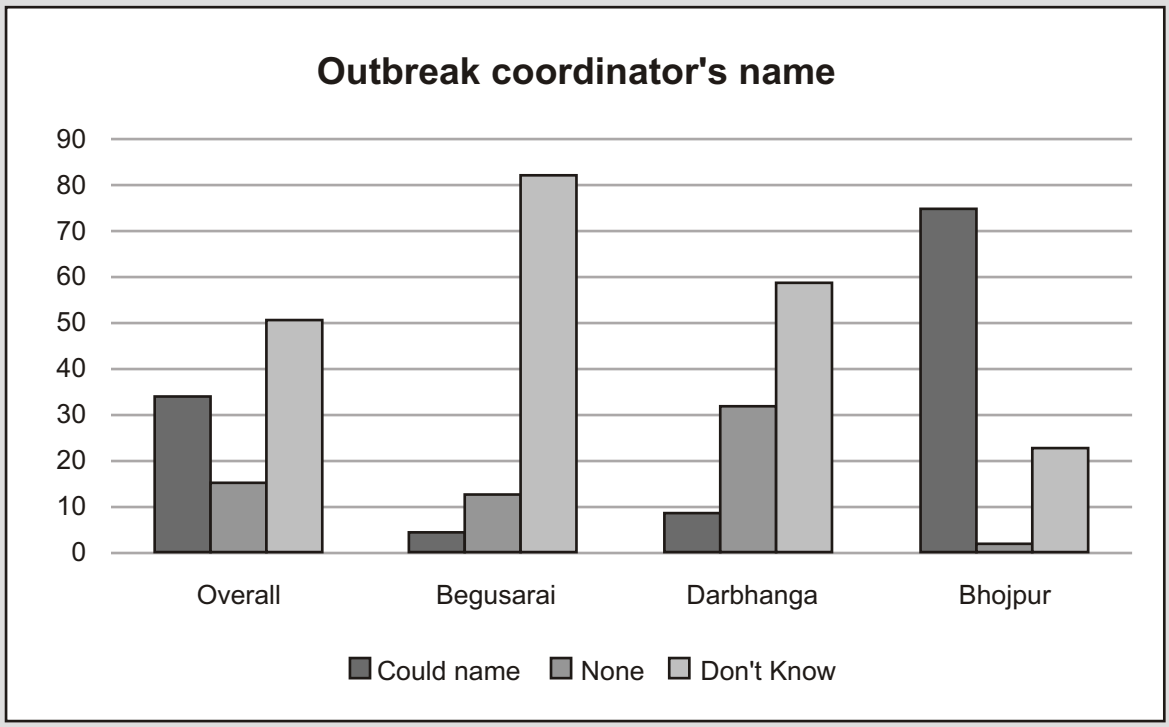
Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	Mean (95% CI)	Frequency	Mean (95% CI)	Frequency	Mean (95% CI)	Frequency	Mean (95% CI)
Second time recording	No definite standard followed & New report are not recorded	12	4.74(2.11- 7.38)	–	–	8	8.89 (2.90-14.88)	4	4.00 (0.09-7.91)
	Discard previous & enter current report as a new entry	10	3.95(1.54- 6.37)	3	4.76 (0.00-10.17)	5	5.56 (0.73-10.38)	2	2.00 (0.00-4.79)
	Add the current report to the previous one	231	91.30(87.81-94.80)	60	95.24 (89.83-100.0)	77	85.56 (78.15-92.96)	94	94.00 (89.26-98.74)
Overall	Poor	117	46.25(40.06-52.43)	8	12.70 (4.25-21.15)	67	74.44 (65.26-83.63)	42	42.00 (32.16-51.84)
	Average	74	29.25(23.61-34.89)	17	26.98 (15.72-38.25)	20	22.22 (13.47-30.98)	37	37.00 (27.37-46.63)
	Good	62	24.51(19.17-29.84)	38	60.32 (47.90-72.74)	3	3.33 (0.00-7.11)	21	21.00 (12.88-29.12)

Table 3 : "Physicians' practice related to data analysis and emergency management in three studied districts of Bihar, 2019 (n=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Analysis and interpretation of data	Never	143	56.52(50.37-62.67)	2	3.17 (0.00-7.63)	71	78.89 (70.29-87.48)	70	70.00 (60.86-79.14)
	Yes, sometime	62	24.51(19.17-29.84)	25	39.68 (27.26-52.10)	18	20.00 (11.58-28.42)	19	19.00 (11.18-26.82)
	Yes, regularly	48	18.97(14.11-23.84)	36	57.14 (44.58-69.71)	1	1.11 (0.00-3.32)	11	11.00 (4.76-17.24)
Existence of a rapid response team	Yes sometimes	46	23.96(17.87-30.05)	17	28.33 (16.59-40.07)	6	6.67 (1.41-11.92)	11	11.58 (5.03-18.13)
	Yes, always	146	76.04(69.95-82.13)	43	71.67 (59.93-83.41)	19	51.35 (34.46-68.25)	84	88.42 (81.87-94.97)
Presence of a designated surveillance committee at district	No	6	4.23(0.88- 7.57)	2	9.09 (0.00-22.14)	4	13.33 (0.42-26.24)	-	-
	Yes	136	95.77(92.43-99.12)	20	90.91 (77.86-100.0)	26	86.67 (73.76-99.58)	90	100.0 (100.0-100.0)
Presence of verification copies of outbreak	No	131	85.62(80.00-91.24)	56	100.0 (100.0-100.0)	39	82.98 (71.82-94.13)	36	72.00 (59.11-84.89)
	Yes	22	14.38(8.76-20.00)	–	–	8	17.02 (5.87-28.18)	14	28.00 (15.11-40.89)
Availability of appropriate supplies during outbreaks	No	33	13.04(8.87-17.22)	1	1.59 (0.00-4.76)	27	30.00 (20.35-39.65)	5	5.00 (0.65-9.35)
	Yes, sometimes	38	15.02(10.59-19.45)	10	15.87 (6.60-25.15)	25	27.78 (18.34-37.21)	3	3.00 (0.00-6.40)
	Yes, always	182	71.94(66.36-77.51)	52	82.54 (72.90-92.18)	38	42.22 (31.82-52.62)	92	92.00 (86.59-97.41)
Access to emergency stocks	No	12	4.74(2.11- 7.38)	1	1.59 (0.00-4.76)	10	11.11 (4.49-17.73)	1	1.00 (0.00-2.98)
	Yes, sometimes	39	15.42(10.94-19.89)	8	12.70 (4.25-21.15)	26	28.89 (19.34-38.44)	5	5.00 (0.65-9.35)
	Yes, always	202	79.84(74.86-84.82)	54	85.71 (76.83-94.60)	54	60.00 (49.68-70.32)	94	94.00 (89.26-98.74)

Table 3 : "Physicians' practice related to data analysis and emergency management in three studied districts of Bihar, 2019 (n=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Access to emergency funds	No	152	60.08(54.00-66.15)	56	88.89 (80.91-96.87)	64	71.11 (61.56-80.66)	32	32.00 (22.70-41.30)
	Yes, sometimes	15	5.93(3.00- 8.86)	4	6.35 (0.16-12.54)	8	8.89 (2.90-14.88)	3	3.00 (0.00-6.40)
	Yes, always	86	33.99(28.12-39.87)	3	4.76 (0.00-10.17)	18	20.00 (11.58-28.42)	65	65.00 (55.49-74.51)
Allowance for vehicle use	No	49	19.37(14.46-24.27)	5	7.94 (1.07-14.80)	33	36.67 (26.52-46.82)	11	11.00 (4.76-17.24)
	Yes, sometimes	54	21.34(16.26-26.43)	33	52.38 (39.70-65.06)	18	20.00 (11.58-28.42)	3	3.00 (0.00-6.40)
	Yes, always	150	59.29(53.19-65.38)	25	39.68 (27.26-52.10)	39	43.33 (32.90-53.77)	86	86.00 (79.08-92.92)
Overall	Poor	86	33.99(28.12-39.87)	21	33.33 (21.37-45.30)	57	63.33 (53.18-73.48)	8	8.00 (2.59-13.41)
	Average	84	33.20(27.36-39.04)	36	57.14 (44.58-69.71)	18	20.00 (11.58-28.42)	30	30.00 (20.86-39.14)
	Good	83	32.81(26.98-38.63)	6	9.52 (2.07-16.98)	15	16.67 (8.82-24.52)	62	62.00 (52.32-71.68)
Need for lab confirmation for public health response during outbreak	Yes	53	20.95(15.90-26.00)	9	14.29 (5.40-23.17)	29	32.22 (22.38-42.07)	15	15.00 (7.88-22.12)
	No	192	75.89(70.58-81.20)	54	85.71 (76.83-94.60)	53	58.89 (48.53-69.25)	85	85.00 (77.88-92.12)
	Don't know	8	3.16(0.99- 5.33)	–	–	8	8.89 (2.90-14.88)	–	–


Outbreak coordinator's name
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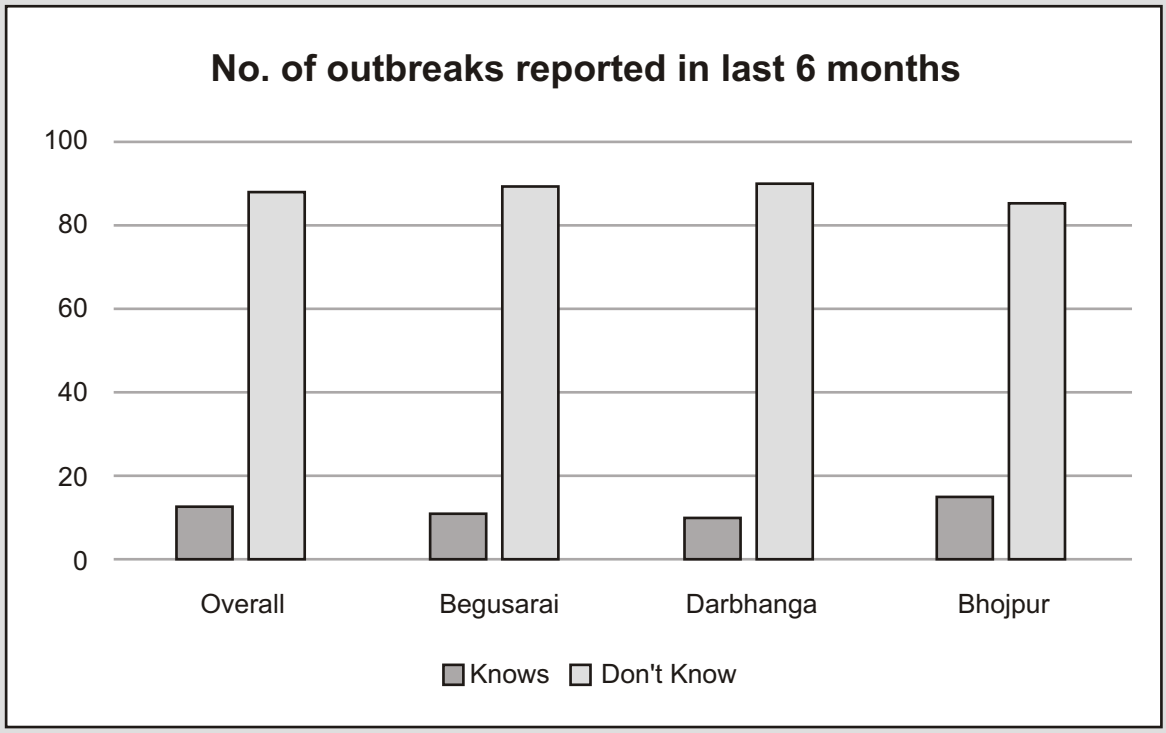
80
70
60
50
40
30
20
10
0
Overall
Begusarai
Darbhanga
Bhojpur
Could name
None
Don't Know


No. of outbreaks reported in last 6 months
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80
60
40
20
0
Overall
Begusarai
Darbhanga
Bhojpur
Knows
Don't Know

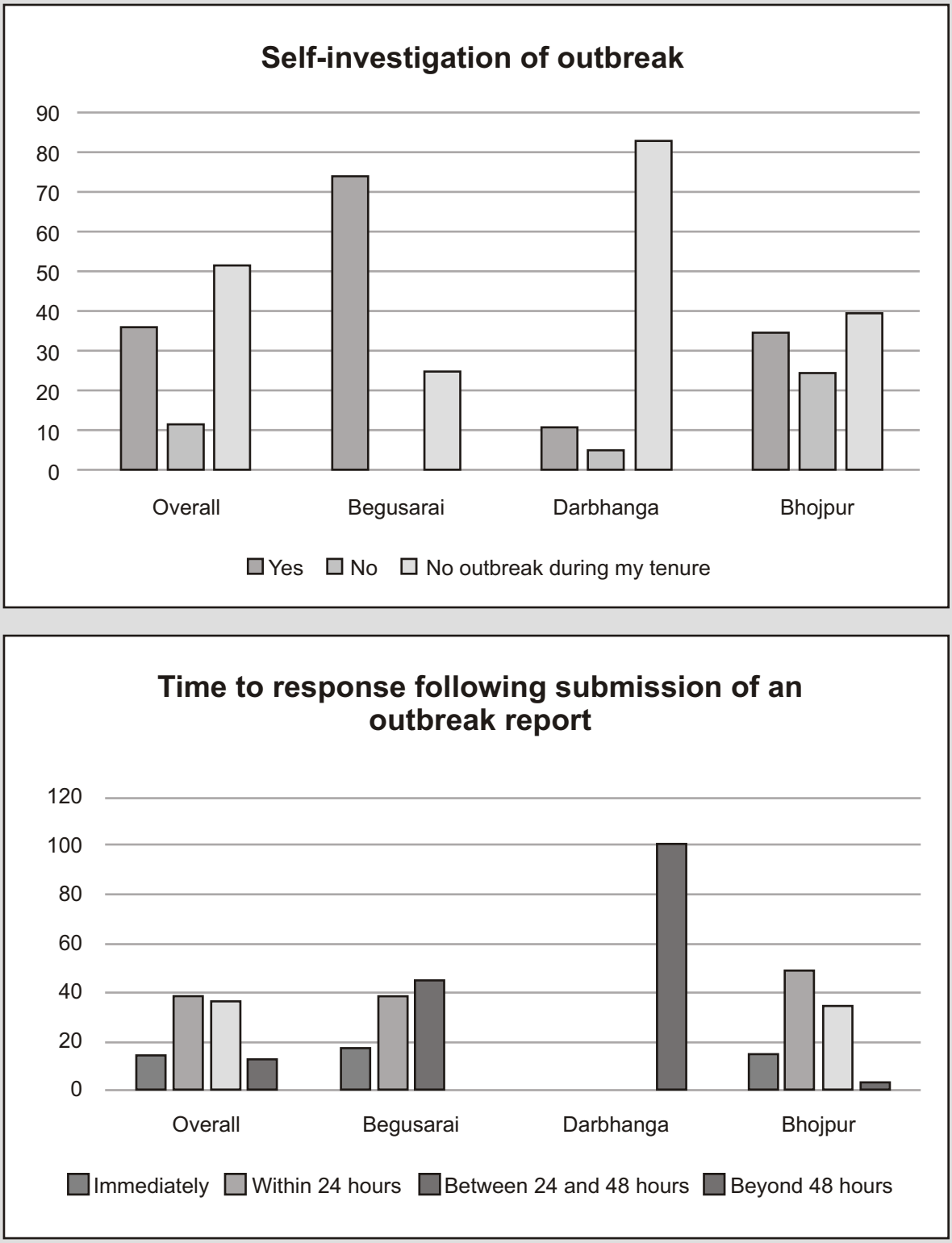

Figure 2 : Physicians' practice of outbreak response under IDSP in the three studied districts of Bihar, 2019 (n=253)

Table 4 : Physicians' general outbreak preparedness and response under IDSP in the three studied districts of Bihar, 2019 (n=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Prevention and control measure following submission of the outbreak report	Yes	149	58.89(52.79-65.00)	46	73.02 (61.75-84.28)	19	21.11 (12.52-29.71)	84	84.00 (76.69-91.31)
	No	11	4.35(1.82- 6.88)	1	1.59 (0.00-4.76)	9	10.00 (3.68-16.32)	1	1.00 (0.00-2.98)
	No outbreak	93	36.76(30.78-42.74)	16	25.40 (14.35-36.45)	62	68.89 (59.14-78.64)	15	15.00 (7.88-22.12
Prevention and control measure following submission of the outbreak report: Water purification	No	16	10.74(5.71-15.77)	–	–	11	57.89 (33.45-82.34)	5	5.95 (0.79-11.12)
	Yes, but not always	17	11.41(6.25-16.57)	11	23.91 (11.11-36.72)	–	–	6	7.14 (1.52-12.77)
	Yes, always	116	77.85(71.11-84.60)	35	76.09 (63.28-88.89)	8	42.11 (17.66-66.55)	73	86.90 (79.54-94.27)
Prevention and control measure following submission of the outbreak report: Container surveys	No	67	44.97(36.89-53.05)	25	54.35 (39.39-69.30)	16	84.21 (66.15-100.0)	26	30.95 (20.86-41.05)
	Yes, but not always	54	36.24(28.43-44.05)	10	21.74 (9.35-34.12)	3	15.79 (0.00-33.85)	41	48.81 (37.90-59.72)
	Yes, always	28	18.79(12.45-25.14)	11	23.91 (11.11-36.72)	–	–	17	20.24 (11.47-29.01)
Prevention and control measure following submission of the outbreak report: Awareness campaigns	No	12	8.05(3.63-12.47)	–	–	12	63.16 (39.27-87.04)	–	–
	Yes, but not always	6	4.03(0.83- 7.22)	4	8.70 (0.24-17.16)	1	5.26 (0.00-16.32)	1	1.19 (0.00-3.56)
	Yes, always	131	87.92(82.63-93.21)	42	91.30 (82.84-99.76)	6	31.58 (8.56-54.60)	83	98.81 (96.44-100.0)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Prevention and control measure following submission of the outbreak report: Stock medication	No	15	10.07(5.18-14.95)	–	–	12	63.16 (39.27-87.04)	3	3.57 (0.00-7.62)
	Yes, but not always	2	1.34(0.00- 3.21)	1	2.17 (0.00-6.55)	–	–	1	1.19 (0.00-3.56)
	Yes, always	132	88.59(83.43-93.75)	45	97.83 (93.45-100.0)	7	36.84 (12.96-60.73)	80	95.24 (90.59-99.89)
Prevention and control measure following submission of the outbreak report: Mass chemopro-phylaxis	No	16	10.74(5.71-15.77)	–	–	14	73.68 (51.88-95.49)	2	2.38 (0.00-5.71)
	Yes, but not always	12	8.05(3.63-12.47)	1	2.17 (0.00-6.55)	2	10.53 (0.00-25.72)	9	10.71 (3.96-17.47)
	Yes, always	121	81.21(74.86-87.55)	45	97.83 (93.45-100.0)	3	15.79 (0.00-33.85)	73	86.90 (79.54-94.27)
Overall practice regarding control measure during an outbreak	Poor	84	56.38(48.32-64.43)	31	67.39 (53.32-81.47)	18	94.74 (83.68-100.0)	35	41.67 (30.90-52.43)
	Average	40	26.85(19.65-34.04)	5	10.87 (1.52-20.21)	1	5.26 (0.00-16.32)	34	40.48 (29.76-51.19)
	Good	25	16.78(10.71-22.85)	10	21.74 (9.35-34.12)	–	–	15	17.86 (9.50-26.22)

Table 5 : Training and supervision of the physicians under IDSP in the three studied districts of Bihar, 2019 (n=253)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Formal training received	Yes, before joining	7	2.77(0.73- 4.80)	-	-	4	4.44 (0.10-8.78)	3	3.00 (0.00-6.40)
	Yes, immediately after joining	48	18.97(14.11-23.84)	28	44.44 (31.83-57.06)	17	18.89 (10.64-27.13)	3	3.00 (0.00-6.40)
	No	198	78.26(73.14-83.38)	35	55.56 (42.94-68.17)	69	76.67 (67.76-85.57)	94	94.00 (89.26-98.74)
Formal training received	No	198	78.26(73.14-83.38)	35	55.56 (42.94-68.17)	69	76.67 (67.76-85.57)	94	94.00 (89.26-98.74)
	Yes	55	21.74(16.62-26.86)	28	44.44 (31.83-57.06)	21	23.33 (14.43-32.24)	6	6.00 (1.26-10.74)
Number of training received in the past	No Training received	218	86.17(81.88-90.45)	58	92.06 (85.20-98.93)	77	85.56 (78.15-92.96)	83	83.00 (75.51-90.49)
	One training	23	9.09(5.52-12.66)	4	6.35 (0.16-12.54)	10	11.11 (4.49-17.73)	9	9.00 (3.29-14.71)
	Two trainings	9	3.56(1.26- 5.86)	1	1.59 (0.00-4.76)	2	2.22 (0.00-5.33)	6	6.00 (1.26-10.74)
	Three trainings	2	0.79(0.00- 1.89)	-		1	1.11 (0.00-3.32)	1	1.00 (0.00-2.98)
	Four trainings	1	0.40(0.00- 1.17)	-	-	-	-	1	1.00 (0.00-2.98)
Supervision of employee's work	Yes, always	40	15.81(11.28-20.34)	10	15.87 (6.60-25.15)	15	16.67 (8.82-24.52)	15	15.00 (7.88-22.12)
	Yes, sometimes	37	14.62(10.24-19.01)	11	17.46 (7.82-27.10)	10	11.11 (4.49-17.73)	16	16.00 (8.69-23.31)
	No	176	69.57(63.86-75.27)	42	66.67 (54.70-78.63)	65	72.22 (62.79-81.66)	69	69.00 (59.78-78.22)
Supervision by District Surveillance Officers	Yes, always	43	17.00(12.34-21.66)	15	23.81 (13.00-34.62)	6	6.67 (1.41-11.92)	22	22.00 (13.74-30.26)
	Yes, sometimes	90	35.57(29.63-41.51)	43	68.25 (56.44-80.07)	16	17.78 (9.73-25.83)	31	31.00 (21.78-40.22)
	No	120	47.43(41.24-53.63)	5	7.94 (1.07-14.80)	68	75.56 (66.50-84.61)	47	47.00 (37.05-56.95)
Feedback from district	Yes	90	35.57(29.63-41.51)	27	42.86 (30.29-55.42)	15	16.67 (8.82-24.52)	48	48.00 (38.04-57.96)
	No	163	64.43(58.49-70.37)	36	57.14 (44.58-69.71)	75	83.33 (75.48-91.18)	52	52.00 (42.04-61.96)

Indicator	Category	Overall		Begusarai		Darbhanga		Bhojpur	
		Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)	Frequency	% (95% CI)
Interval of feedback from district	Monthly	44	48.89(38.36-59.42)	15	55.56 (35.52-75.59)	7	46.67 (18.07-75.26)	22	45.83 (31.21-60.45)
	Quarterly	27	30.00(20.35-39.65)	5	18.52 (2.86-34.18)	4	26.67 (1.32-52.02)	18	37.50 (23.29-51.71)
	Annually	11	12.22(5.32-19.12)	2	7.41 (0.00-17.96)	1	6.67 (0.00-20.97)	8	16.67 (5.73-27.60)
	Only during an outbreak	8	8.89(2.90-14.88)	5	18.52 (2.86-34.18)	3	20.00 (0.00-42.93)	–	–
Organization of workshop & guideline by district team	Yes, regularly	28	11.07(7.18-14.96)	19	30.16 (18.51-41.81)	5	5.56 (0.73-10.38)	4	4.00 (0.09-7.91)
	Yes, not regularly	56	22.13(16.98-27.28)	31	49.21 (36.51-61.90)	10	11.11 (4.49-17.73)	15	15.00 (7.88-22.12)
	No	169	66.80(60.96-72.64)	13	20.63 (10.36-30.91)	75	83.33 (75.48-91.18)	81	81.00 (73.18-88.82)
Satisfaction with the content of the last workshop	Fully	68	80.95(72.38-89.53)	44	88.00 (78.67-97.33)	7	46.67 (18.07-75.26)	17	89.47 (74.28-100.0)
	Partially	13	15.48(7.58-23.37)	6	12.00 (2.67-21.33)	7	46.67 (18.07-75.26)	–	–
	No	2	2.38(0.00- 5.71)	–	–	1	6.67 (0.00-20.97)	1	5.26 (0.00-16.32)
	Did not participate	1	1.19(0.00- 3.56)	–	–	–	–	1	5.26 (0.00-16.32)

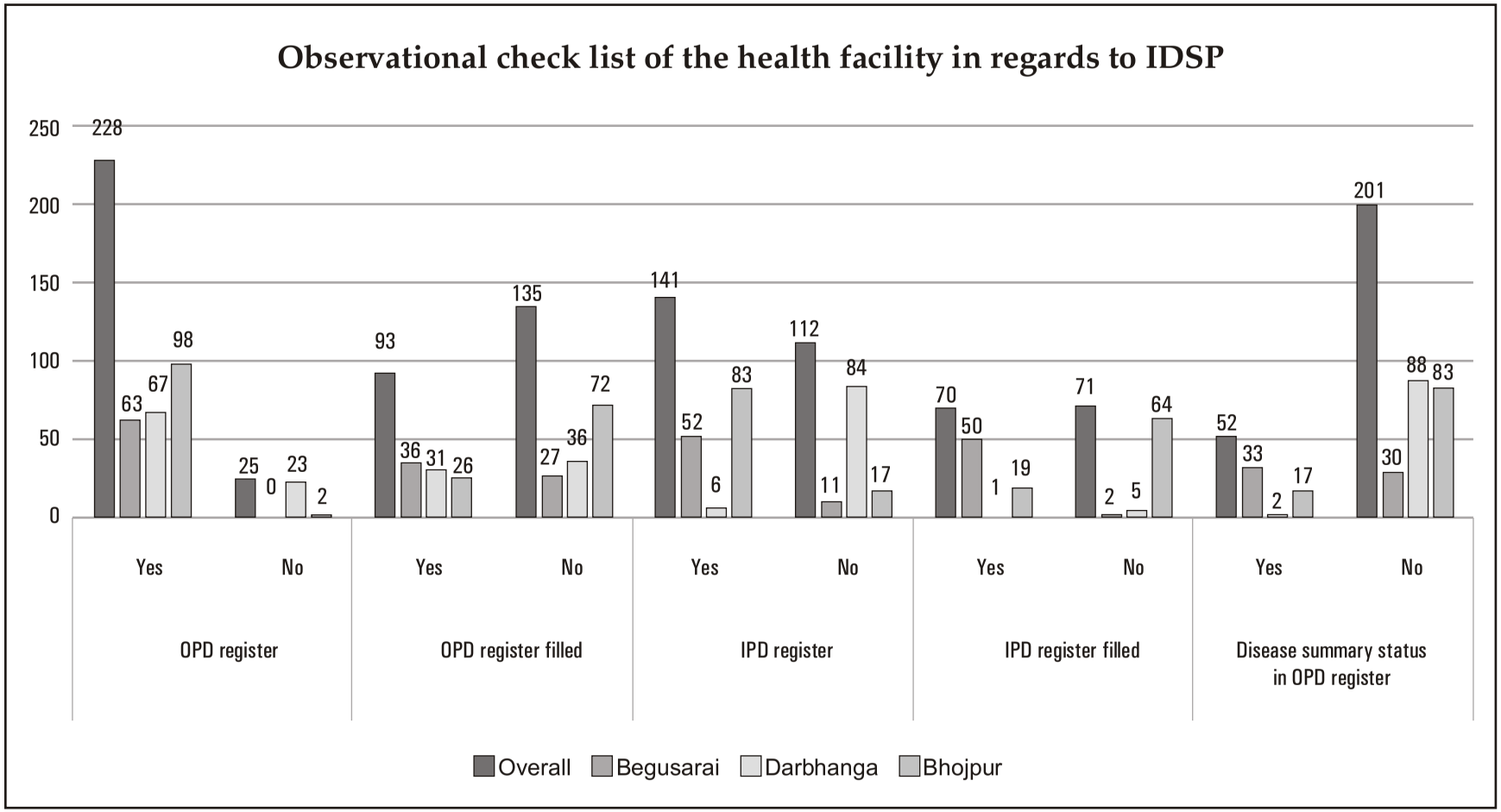

Figure 3a : Observational checklist of the health facility in regards to IDSP in the three studied districts of Bihar, 2019 (n=253)

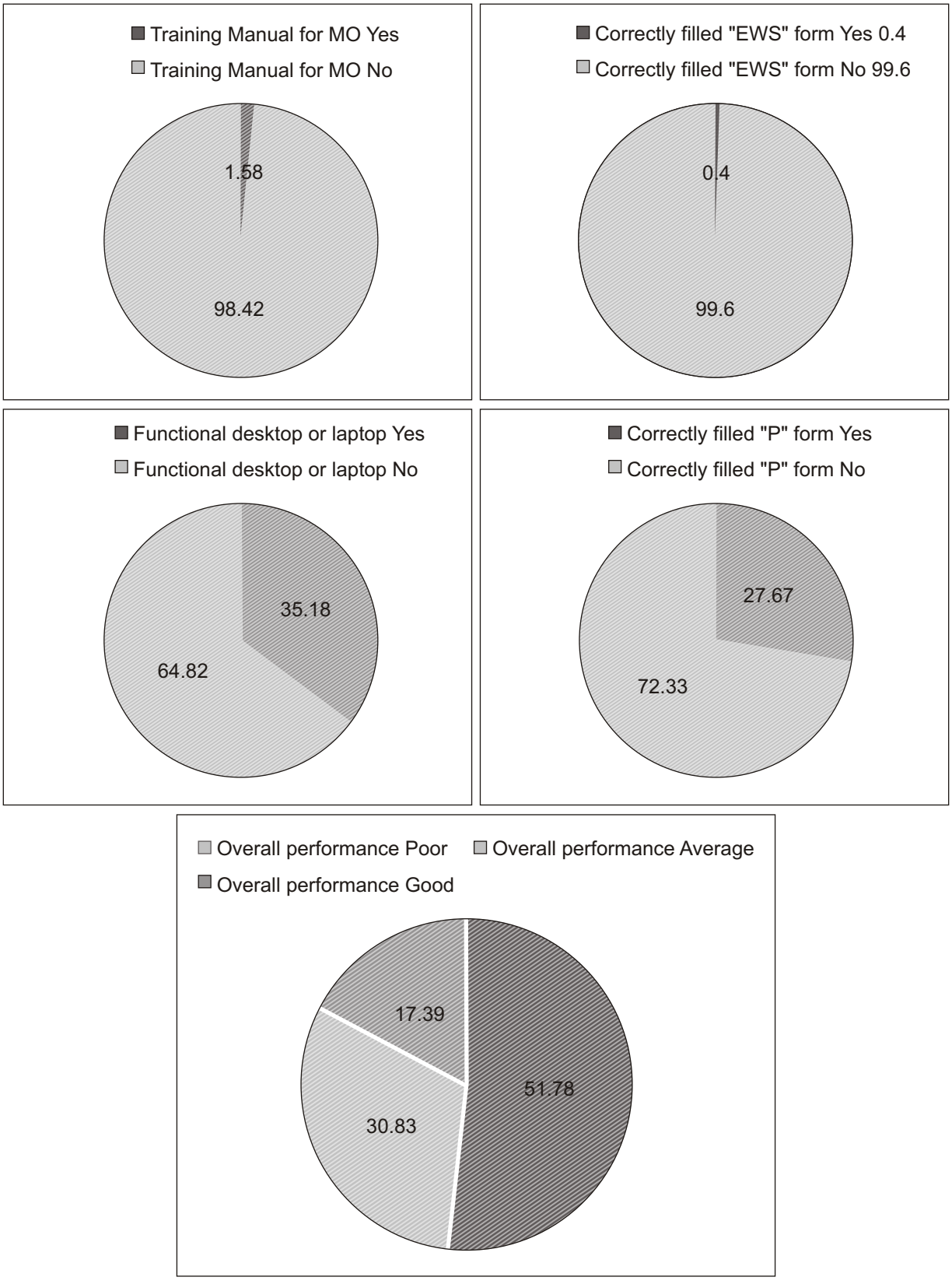

Figure 3b : Observational checklist of the health facility in regards to IDSP in the three studied districts of Bihar, 2019 (n=253)

Table 6 : Factors effecting Physicians' practice of filling the P-Form of IDSP in the three studied districts of Bihar, 2019 (n=253)

Description	Categories	Measures	P form correctly filled or not (Reference = No)	
			Yes	
			OR* (95% CI)	**p-Value**
Doctor's Age	–	UOR	1.01(0.98- 1.03)	0.4674
		AOR	1.00(0.98- 1.03)	0.7576
Doctor's Professional degree (Reference = Ayush)	Others	UOR	3.37(0.93-12.16)	0.0639
		AOR	3.26(0.85-12.54)	0.0862
	MBBS	UOR	5.31(2.29-12.33)	0.0001
		AOR	4.86(2.02-11.68)	0.0004
Overall Knowledge (Reference = Poor)	Average	UOR	5.43(2.64-11.14)	< .0001
		AOR	4.98(2.37-10.44)	< .0001
	Good	UOR	3.09(1.40- 6.84)	0.0053
		AOR	2.32(1.02- 5.28)	0.0456
Received formal training on IDSP (Reference = No)	Yes	UOR	0.31(0.13- 0.73)	0.0071
		AOR	0.30(0.12- 0.74)	0.0094
System level readiness (Reference = Poor)	Average	UOR	3.04(1.66- 5.55)	0.0003
		AOR	2.73(1.46- 5.12)	0.0017
	Good	UOR	0.25(0.07- 0.85)	0.0269
		AOR	0.23(0.06- 0.80)	0.0214

Age and Degree of doctors adjusted with all exposures

OR* = Odds Ratio UOR = Unadjusted Odds Ratio AOR = Adjusted Odds Ratio

Table 7 : Factors effecting Physicians' practice of putting provisional diagnosis in IDSP in the three studied districts of Bihar, 2019 (n=253)

Description	Categories	Measures	Practice of putting provisional diagnosis (Reference = No)			
			Yes, sometimes		Yes, always	
			OR* (95% CI)	P-Value	OR (95% CI)	P-Value
Doctor's Age	–	UOR	0.99(0.96- 1.03)	0.6987	1.00(0.98- 1.02)	0.9408
		AOR	0.99(0.96- 1.03)	0.6207	1.00(0.97- 1.02)	0.8999
Doctor's Professional degree (Reference = Ayush)	Others	UOR	0.47(0.05- 4.37)	0.5045	1.60(0.53- 4.80)	0.4018
		AOR	0.43(0.05- 4.05)	0.4596	1.37(0.42- 4.49)	0.6065
	MBBS	UOR	1.14(0.48- 2.70)	0.7678	1.06(0.58- 1.93)	0.855
		AOR	1.06(0.44- 2.54)	0.8996	0.86(0.45- 1.64)	0.6394
System level readiness (Reference = Inappropriate)	Appropriate	UOR	2.16(0.95- 4.87)	0.0646	5.68(3.14-10.30)	< .0001
		AOR	2.15(0.95- 4.90)	0.0674	5.78(3.17-10.54)	< .0001

Age and Degree of doctors adjusted with all exposure

OR* = Odds Ratio UOR = Unadjusted Odds Ratio AOR = Adjusted Odds Ratio

Table 8 : Factors effecting Physicians' general practice in IDSP in the three studied districts of Bihar, 2019 (n=253)

Description	Categories	Measures	Overall Practice (Reference = Poor)			
			Average	Good		
			OR* (95% CI)	p-value	OR (95% CI)	p-value
Doctor's Age	–	UOR	1.02(0.99- 1.04)	0.1937	1.01(0.99- 1.04)	0.3092
		AOR	1.01(0.98- 1.04)	0.3864	1.01(0.97- 1.04)	0.7311
Doctor's Professional degree	Others	UOR	0.85(0.24- 3.02)	0.8001	1.17(0.32- 4.32)	0.8085
(Reference = Ayush)		AOR	0.85(0.23- 3.18)	0.8076	1.47(0.33- 6.56)	0.615
	MBBS	UOR	1.90(0.98- 3.68)	0.0584	2.27(1.09- 4.71)	0.0275
		AOR	1.44(0.71- 2.91)	0.3104	1.16(0.48- 2.77)	0.742
Overall Knowledge	Average	UOR	3.73(1.91- 7.30)	0.0001	10.30(3.56-29.75)	< .0001
(Reference = Poor)		AOR	3.52(1.78- 6.94)	0.0003	10.06(3.46-29.23)	< .0001
	Good	UOR	5.29(2.11-13.23)	0.0004	54.72(17.42-171.8)	< .0001
		AOR	4.58(1.79-11.69)	0.0015	53.64(16.61-173.2)	< .0001
System level readiness	Average	UOR	3.44(1.75- 6.77)	0.0004	12.72(5.09-31.76)	< .0001
(Reference = Poor)		AOR	3.37(1.69- 6.74)	0.0006	12.00(4.74-30.43)	< .0001
	Good	UOR	8.18(2.46-27.16)	0.0006	78.75(22.05-281.2)	< .0001
		AOR	9.17(2.70-31.17)	0.0004	94.95(25.44-354.3)	< .0001
Received formal training on IDSP	Yes	UOR	2.18(1.04- 4.58)	0.0394	3.01(1.42- 6.36)	0.004
(Reference = No)		AOR	2.36(1.06- 5.24)	0.0358	3.75(1.63- 8.61)	0.0018

Age and Degree of doctors adjusted with all exposure

OR* = Odds Ratio UOR = Unadjusted Odds Ratio AOR = Adjusted Odds Ratio

Discussion

To the best of our knowledge, this was the first study that assessed physicians' practices with regard to communicable disease surveillance activities from three districts in Bihar - Begusarai, Darbhanga, and Bhojpur between January and April 2019. Of the total 253 consenting physicians, about 54% were found to be under contractual employment. Currently, the public health system in India recruit physicians in two distinct cadres: permanent cadre of medical officers (MOs) and contractual employees which also includes practitioners of Indian systems of medicine. These distinct recruitment policies for the same positions and duties can have serious consequences. Compared to permanent medical professionals, temporary medical officers experienced relatively more job-related stress and had lower job satisfaction. (21-23) Also, the greater length of service showed to have a positive influence on job satisfaction of physicians, (24) which the contractual physicians might lack. As reported elsewhere, (21-23) job-related stress was reported by the participants, particularly those who were contractual.

Compared to professionals with an MBBS degree, a large number of AYUSH practitioners were attached to the PHCs and were also entitled to report to IDSP. India is facing an acute and growing shortage of qualified trained professionals, with a poor doctor-patient ratio. Moreover, the distribution of allopathic doctors is also skewed, predominantly serving the urban population. One way the country is managing this scarcity is by encouraging and promoting involvment of AYUSH in the public health system. Adding AYUSH doctors into primary healthcare improves the doctor-to-patient ratio substantially. (25) In many cases, AYUSH practitioners are the only practitioners in some remote areas and act as a crucial link between the community and the health system. However, care should be taken that proper orientation and training are provided to them by professionals to improve their competence in the related field. In the current study, MBBS doctors were found to have better practice of reporting of probable cases of infectious diseases compared with AYUSH doctors. These findings may suggest the need of special training for non-allopathic doctors to enable them improve their disease detection, surveillance and outbreak management capabilities as reported elsewhere. (26-28)

In the present study, only three-fourth of the responding physicians used standard case definitions to diagnose patients. Previous studies also corroborated that awareness and practice of using standard case definition in diagnosis and reporting of communicable diseases under IDSP were limited among healthcare professionals. (29) Thus, orientation

of medical professionals involved in IDSP regarding the its importance on a regular basis might translate the acquired knowledge into good practice of reporting.

Findings revealed that nearly half of the participants did not put provisional diagnosis in OPD register. This practice of not writing the provisional diagnosis is quite common throughout the country in public health facilities. (30) The most common explanation put forward by the physicians for this lapse was the overwhelming burden of patients and lack of laboratory support. Perhaps prescription slips with the reportable diseases printed on them and requiring them to only tick the appropriate diagnosis may improve the reliability and quality of the reported surveillance.

Analysis and interpretation of the data collected for IDSP was never undertaken by any physician in Darbhanga and Bhojpur. However, 57% of the Medical Officers in Begusarai reported to carry out regular analysis. This non-utilization of surveillance data is a common issue observed almost everywhere. A study in eight countries of Africa revealed that analysis of surveillance data ranged between 60% and 86% in the districts. (31) Another prior study in Tanzania showed that only 32% of the surveyed facilities performed trend analysis. (32)

Most of the physicians in this study did not know who the outbreak co-ordinator was and neither could name the number of outbreaks that happened in their area over the last six months. Given 52% of the respondents reported that outbreak did not happen during their tenure, their practices of relevance to outbreak investigation could not be explicitly explored. The average response time for an outbreak in Darbhanga was more than 48 hours. To implement effective control measures against outbreaks, response time is critical and though it varies with diseases, early response is always merited. (33) Findings revealed that overall poor outbreak preparedness existed among 34% of the health facilities. This figure increased to 63% in Darbhanga. Several countries have published guidelines on how to prepare to respond to an outbreak (34) and a Bihar-specific outbreak preparedness and response guideline may be necessary to overcome the inadequacy observed in the study.

Trainings are crucial in increasing the competence of detection, reporting and responding to disease epidemics and other public health events in a timely manner. It emerged from the current study that 78% physicians did not receive any formal training on IDSP. The positive impact of training on disease notification habit of doctors had been well documented previously. (35, 36) The current study showed a positive association between

receiving IDSP-related training and practice of IDSP functions among the medical officers. Therefore, organization training and re-training of all physicians reporting under IDSP should be prioritized.

About 70% of the respondents admitted to not supervising their subordinate employees' work. Globally, supervision gap has been previously shown to directly affecting the performance and the quality of the surveillance. The frontline health workers like Auxiliary Nurse Midwife (ANM) experienced difficulties in getting technical support and thus are unable to improve their work performance without proper supportive supervision. (37, 38) Alike, prior studies also emphasized the need of supervision and feedback to the ANMs regarding IDSP from the medical officers to improve their engagement and performance. (35, 39)

System-level readiness in the current paper was judged by following an observational checklist of all the IDSP facilities in the three studied districts. In Darbhanga, 89% of the IDSP reporting units were not well prepared to handle disease outbreaks. Similarly, 44% of the health facilities in Bhojpur also had poor system-level readiness. Therefore, care should be taken so that all frontline workers reporting to IDSP can work in an enabling environment to maximize the effectiveness of the existing ones.

Limitations

This was a comprehensive study that provided a unique opportunity to explore the practices of physicians employed in the public health system of Bihar with regard to the IDSP, though there were some limitations. The major limitation of the study was due to its cross-sectional design that limited causal interpretation between exposure (knowledge, system readiness, training etc.) and outcome (practice), because the exposure and outcome were simultaneously assessed and not longitudinally. Secondly, as the participants were mostly from primary or secondary care facilities in three districts of the state, caution must be exercised when generalizing the findings beyond the study area. Lastly, chances of social desirability bias may not be completely ruled out as some of the responses were self-reported and the risk of exaggeration of good practices is common. Despite such limitations, this is the first comprehensive document that assessed the physicians' practices related to communicable disease surveillance in Bihar.

Conclusion

Overall poor surveillance and outbreak-related practices were observed among majority of the physicians reporting to the IDSP in Bihar. Sustained supervision of subordinates, giving timely feedback and engaging in communication with them were mostly overlooked. Undertaking of data analysis by the medical officers at the district and sub-district level health facility was inadequate. Surveillance, outbreak detection and response to outbreak remained limited in all the three studied districts. Though trained district personnel are key to the performance of the national disease surveillance, IDSP-related training was provided to only a small percentage of the study respondents. MBBS degree and having good knowledge were associated with improved IDSP reporting. Also, significant difference in surveillance practices was found between MBBS and AYUSH practitioners. This suggests that regular training of district personnel coupled with simplified reporting format for provisional diagnosis could contribute to improved performance of the physicians in reporting to the IDSP, Bihar.

Recommendation:

Based on learnings from this study, the following recommendations are made that would improve the productivity and engagement altogether culminating into improved health outcomes.

- Orientation of recently recruited medical doctors to overall scenario of communicable diseases in Bihar, existing control programs including IDSP and workflow by experienced senior doctors (Civil Surgeon, Additional Chief Medical officers) at the district level
- Organizing physician-training programs at the district and state levels, clarifying their specific roles and responsibilities related to routine surveillance activities and outbreak investigation process
- Physicians should be aware of basic case definition of communicable diseases endemic to Bihar and management of probable cases
- Basic hands-on training should be provided to health care providers regarding data related to IDSP, database management, analysis and interpretation of disease trend, any outbreak, etc.

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Notes

The Centre for Health Policy (CHP) at the Asian Development Research Institute (ADRI) has been set up with support from the Bill & Melinda Gates Foundation to strengthen the health sector in Bihar with a multidimensional and multi-disciplinary approach. Its aim is to engage in rigorous analysis of the health system and inform policy makers to fine-tune interventions for even stronger outcomes.

- Research and Analytical Studies

  It constitutes the core of CHP's activities. The areas of research include health infrastructure and delivery with emphasis on equity, health outcomes such as IMR, MMR, TFR and its predictors, health financing, private-public partnerships, regulatory framework and its implementation, and other issues which might emerge.

- Informing Policymakers on Strengthening the Existing Health System

  CHP aims to be the trusted partner of the state Government in providing evidence-based inputs in making the health system stronger, resilient and equitable.

- Sustainable Health Solutions

  CHP recognizes the need for establishing a strong health system which will be self-sustaining. It means immunity to natural disasters/calamities, financial uncertainties and other unanticipated factors. These pillars may be interrelated; CHP will provide a framework of synergy among actors working on these pillars.

- Collaboration

  CHP engages in collaboration with an extensive network of academic and policy research institutions both in India and abroad in health and the broader social sciences.